‘Other people’s money: Does public debt improve economic growth performance of Frontier market economies?’

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Abstract

Sources of long-term growth in an economy hinge on the productive potential of the country. Major contributing factors in the production of an economy include the population representing the labour force, advanced technological inputs, investment and capital accumulation. External debt can be viewed as a critical additional income stream to enhance the productive capacity of an economy, and to supplement internal investment in cases where internal investment is not sufficient to fund economic growth focused projects and activities. However, external debt also has devastating effects on economic growth if left unmonitored or misused. Frontier Market Economies (FMEs), which are economies developing into Emerging Market Economies (EMEs), are amongst the fastest growing in the world with this growth projected to continue into the future. Yet, these countries are often forced to rely on external financing because of insufficient local markets. It is thus of critical importance to ascertain whether external debt has been a benefit or hindrance to these economies in the past, so as to develop appropriate debt management strategies to support their growth in the future. The effect of external debt on economic growth in eight FMEs is examined in this study using the system Generalized Methods of Moments (GMM) model to test for a linear relationship as well as an inverted U-shape curve between external debt and economic growth. An inverted U-shape curve implies that a threshold point exists which signals a point beyond which an economy becomes over-indebted, thus hampering economic growth.

The findings of this study reveal that external debt has a positive and significant impact on economic growth in the FMEs studied. However, there was no inverted U-shape curve between the two variables. Instead a U-shape exists and thus, no maximum level of borrowing was found for the FMEs. Appropriate debt management strategies are discussed in light of the findings. Therefore, with improved demographics and strong consumption growth mixed with a lack of connection from world economics, FMEs have the potential to be part of the rapid growing economies in the world.

CHAPTER ONE: INTRODUCTION

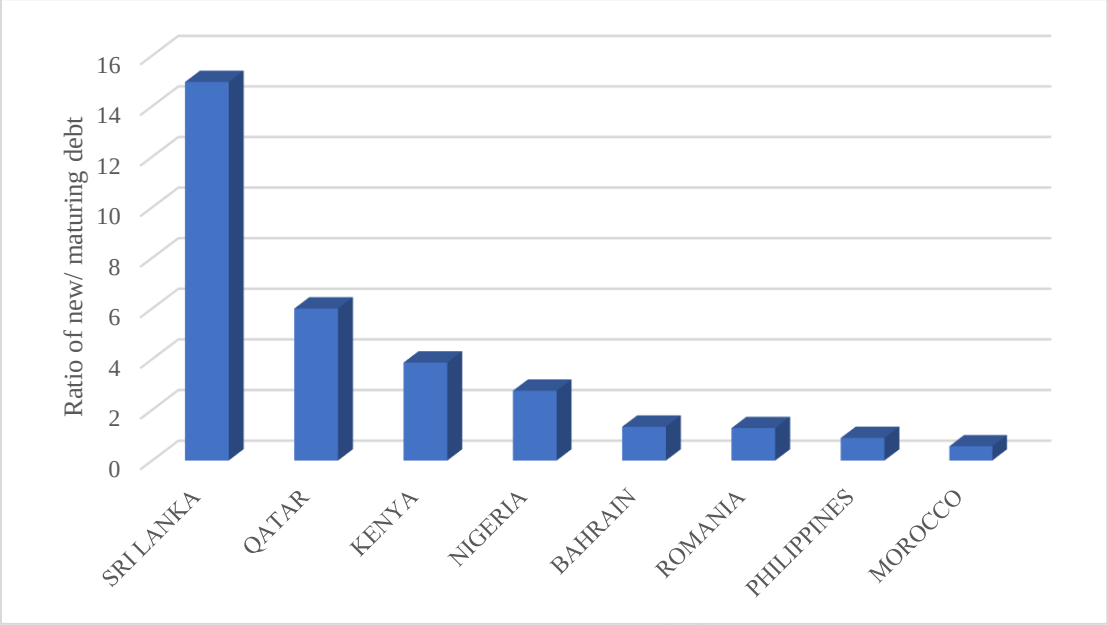
1.1. Background of the study

According to Mody (2004), emerging market economies (EMEs) are those economies transforming from developing countries (DCs) to advanced economies (AEs) (also referred to as developed countries) while frontier market economies (FMEs) are "pre-emerging economies". Nellor (2009) describes frontier markets as a second generation of emerging markets mainly because the stages of development of institutional investors who were part of the emerging markets in the 1980s are evident presently. Bannan and Skov (2016:39) further confirm this by stating that "frontier markets are where emerging markets were in the mid-1990s". While FMEs are seen to have investable stock markets, they are less developed than those of EMEs (Diment, 2016).

In the decade 2008 to 2017, FMEs more than doubled their borrowings in United States (US) dollars. FMEs have also been part of the flurry of international bond issues. For example, in 2018, Sri Lanka, borrowed 12 times the amount of debt it had maturing in that year, with Qatar borrowing 6 times more, while other FMEs like Kenya, Nigeria, and Romania also issued more debt than they had maturing in 2018, as shown in Figure 1.1. This increased debt issuance has resulted in increased stocks of accumulated external debt in these countries. While there is substantial variation in the amount of external debt held by the FMEs, Figure 1.2 demonstrates a number of countries (for which data was available) have high accumulated external debt stocks.

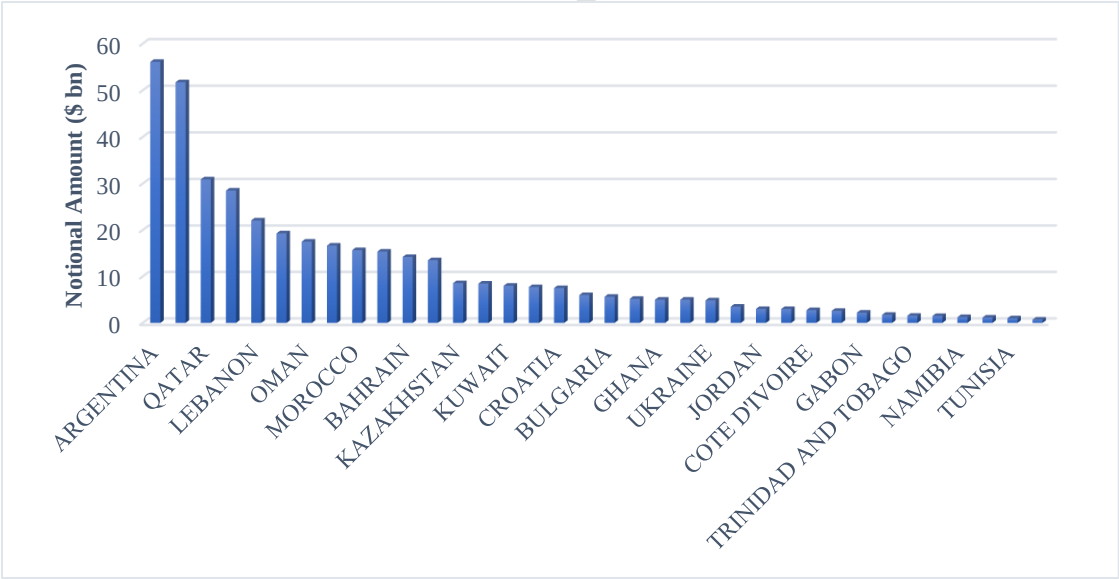
Some FMEs, like their EME counterparts (such as Turkey), have experienced difficulties due to their large accumulated external debt stocks. For example, in 2014, when the Ghanaian cedi lost over 40% of its value against the US dollar, it led to a surge in the nominal value of its US $750 million 2007 Eurobond to over US $3 billion (Reuters, 2014). Moreover, the overreliance of many of these countries on one or two commodities makes their economies very susceptible to commodity price falls and the subsequent draining effect on foreign exchange reserves, limiting their ability to repay international debt. This has also been seen in both Nigeria and Mozambique (RiskyFinance.com, 2018). Ghana and Mozambique have already buckled under the strain of their external debt repayments, turning to the International Monetary Fund (IMF) for assistance.

Figure 1.1: The Ratio of New to Maturing External Debt for a Sample of FMEs in 2018



Source: Author's elaboration, as per RiskyFinance.com (2018)

Figure 1.2: External Debt as of October 2018 for a Sample of FMEs



Source: Author's elaboration as per Riskyfinance.com (2018)

1.2. Problem statement

Emphasis has been put on sustainable economic growth and development as a solution to the demise faced by third world countries. Approximately half of the population in the world survives

on $2 per day. Unemployment is increasing and in places where employment opportunities are present, the quality of the jobs continues to decline such that being employed does not guarantee an escape from poverty. Standards of living are deteriorating, and this affects the overall productivity of an economy (Organization for Economic Development (OECD), 2013).

Sustainable economic growth thus continues to be a core concern for all countries. Effective ways of ensuring economic growth continue to be based on sound macroeconomic policies which aim to generate wealth through private and public investment, reduced inflation, increased national income, employment, productivity and financing the provision of public services (Saunweme & Mufandaedza, 2013). However, for the above to be accomplished, a country must have a strong financial back bone. This is not always the case as government revenue is not adequate to cover expenditures. Further exacerbating the problem is that the ability of the government to borrow domestically is limited due to underdeveloped bond markets and limited domestic saving. As such, governments and firms benefit from globalization by turning to international lenders for external debt. External debt denominated in the foreign currency, plays a key role for developing countries in funding development projects, supporting economic recovery following financial crises (such as the recent commodity price slump), wars and natural disasters. As such, external debt is argued to positively contribute to economic growth through capital accumulation and improved productivity (Patillo et al., 2004; Riffat and Munir, 2015).

Debt financing, however, has to be serviced, and the interest and principle repayments can become burdensome for countries with large accumulated debt stock; diverting government revenue away from the much-needed provision of public goods and services, which harms growth prospects. The government may also be forced to raise taxes and introduce other austerity measures which may be unpopular, lower efficiency, consumption and output, and deter further investment, which all negatively impact growth (Krugman, 1988; Sachs, 1989). External debt has to be serviced in the foreign currency in which it was borrowed while the returns from the capital are domestic currency based. For countries with low foreign currency reserves, domestic currency depreciation can thus compound debt repayments placing further burden on the already constrained fiscus (Eichengreen et al., 2003; Soydan and Bedir, 2015). In the event that the country cannot meet its debt requirements, default will occur. As has been seen in recent times with Argentina and Greece, such defaults can have long-lasting and devastating effects for a country's growth.

These two arguments thus provide contending views on the link between economic growth and external debt. Several studies have examined the relationship between economic growth and external debt, especially in developing countries, with mixed results. Fosu (1996), who studied DCs in Sub-Saharan Africa (SSA), and Weeks (2000) who included DCs from Latin America in his sample, both identified external debt to have a negative effect on economic growth. Shabbir (2013), using a comprehensive sample of 70 DCs, also documented evidence that external debt hampers growth. In contrast, Fincke and Greiner (2015), in their examination of only emerging markets, found that external debt has a positive effect on growth. The results of Patillo et al.'s (2002, 2004) two studies both supported the existence of an inverted U-shaped curve across 93 DCs over the period 1969 to 1998. That is, for countries with low levels of debt, further borrowing positively contributed towards economic growth but beyond a certain point, further debt had harmful effects.

This lack of consensus as to the relationship between external debt and economic growth thus creates grounds for studying this subject. FMEs, like EMEs, have achieved consistently high growth in recent years (Ruijer, 2017). The IMF forecasts this growth to continue with an average annual growth rate of between 1.4% and 14% for FMEs over the next five years compared to only 1.7% for DCs (Ruijer, 2017). Various factors have contributed to this growth. For example, substantial efforts have been made by FMEs to move away from chaotic economic states to become more attractive investment destinations (FTSE Russell, 2014). Prudent economic policies and frameworks have also been adopted to drive sustainable growth. In addition, growing working age populations, rising consumption and investment, and a strong commodity base have contributed to higher growth rates (Diment, 2016; Ruijer, 2017). These economies, however, remain in their infancy with a slightly higher risk profile compared to emerging markets. In particular, political instability, currency fluctuations, volatile commodity prices and a lack of stern regulation make them riskier (Cushman and Wakefield, 2015).

Given the growth that has been achieved in FMEs, but that further growth is still needed to support economic development in these countries, and their increased use of external debt in recent years, it is of value to consider the role that external debt has played in supporting this growth. This is particularly necessary given the recent evidence that some FMEs have experienced substantial problems by accumulating too much foreign-currency based borrowing. An integral component of

this should also be to determine the optimal/threshold level of debt for these countries, so governments can better manage external debt. Several studies have been conducted on emerging markets, as cited previously, but no studies have explicitly focused on the debt-economic growth nexus in FMEs. Given the notable differences between emerging and frontier markets, it is not possible to simply translate the findings from literature. Rather, exclusive attention needs to be given to these countries, whose role in the world is likely to grow substantially in the years ahead. Hence, the combination of a lack of consensus creating an ambiguity of external debt and its effect on economic growth, and the differentiation of FMEs from EMEs creates grounds to investigate this topic.

The research problem which is thus the focus of this study is:

What is the impact of external debt on economic growth in FMEs?

1.3. Research questions and objectives

The research problem specified above can be broken down into the following two questions:

- Is there a linear relationship between external debt and economic growth in FMEs?
- What is the maximum point or threshold of the external debt-to-GDP ratio in FMEs?

Drawing from these, the objectives of the study can be outlined as follows:

- to examine the relationship between economic growth and the external debt-to-GDP ratio of FMEs, and
- to estimate the threshold debt-to-GDP ratio after which additional total external debt no longer improves economic growth in FMEs.

1.4. Justification of the study

Economic growth is critical to the continued developments of FMEs, with external debt presenting an important channel for this as there is empirical evidence of external debt having positive effects on the economic growth rate of a country. The careful monitoring of debt servicing and debt management strategies makes it possible to utilise debt for capital accumulation through investment both in terms of capital accumulation and the improvement of total factor productivity (Krugman, 1988; Sachs, 1989). Coupled with other factors such as low correlation, and high

growth, channelling external debt (to frontier markets) from foreign lenders such as development finance institutions (e.g. the African Development Bank), up to certain threshold points, may strengthen smaller economies and thus close the gap between developed and developing countries. Hence, the development of infrastructure, the eradication of poverty, and the improvement and development of the stock markets may create economic powerhouses from these FMEs. However, it must also be recognised that too much debt can burden a country with interest repayments, diverting scarce financial resources away from critical responsibilities such as education and health care. Thus, it is imperative to fully study the relationship between external debt and economic growth in FMEs so as to determine whether the effects have been positive or negative and ascertain the debt threshold levels. In doing so, governments can make informed debt decisions without the negative consequences.

The results of this study are of importance for governments and policy makers in FMEs so as to know the desired use of external debt to support economic growth, and whether to consider curtailing bond issues in the international market. The latter may suggest that countries need to give more attention to developing local bond markets and encouraging domestic saving. Governments are thus confronted by major policy issues pertaining to debt because of the potential finance it provides to a nation (Boboye & Ojo, 2012). Similarly, the results will aid international financiers, including those at development finance institutions, to be aware of how funds lent to frontier markets will support the growth agendas of these countries, or cause harm. Allied to this, they will have greater knowledge to navigate investment decisions in terms of the likelihood of loan repayments and in satisfying the returns for their own investors.

1.5. Organization of the study

The remainder of this study is structured as follows: Chapter 2 presents the literature review, which includes both the theoretical models that examine the relationship between external debt and economic growth and empirical studies which have tested this relationship. In Chapter 3, the methodology used in this study is described including the data, model specification and estimation techniques. Chapter 4 presents and analyses the results in the context of the theory and the findings of other studies covered in Chapter 2. Lastly, Chapter 5 concludes with policy implications and recommendations for future research.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

External debt has created numerous problems for countries; in some instances, triggering crises. That is, if economies fail to make interest and principal payments, education, health services, infrastructure development and subsequently economic growth are often subsequently sacrificed. On the other hand, external debt presents an important source of funds to finance investment and infrastructure expenditure that can assist in achieving economic growth and development. This chapter seeks to provide further information on the link between economic growth and external debt. Firstly, economic growth is defined, and the theory of economic growth explained. Thereafter, external debt is discussed, its advantages and disadvantages, its link to the original sin hypothesis and most importantly its connection with economic growth. Lastly, a review of the empirical evidence of the relationship between external debt and economic growth in developed and emerging markets is presented.

2.2. Economic growth

Economic growth has been defined by a myriad of economists with differing backgrounds; yet despite this, they reach very similar conclusions. Focusing on the following two definitions, economic growth is defined as:

> "A country's economic growth may be defined as a long-term rise in capacity to supply increasingly diverse economic goods to its population, this growing capacity based on advancing technology and the institutional and ideological adjustments that it demands." (Kuznets, 1971:22)

> "The process of increasing the sizes of national economies, the macro-economic indications, especially the GDP per capita, in an ascendant but not necessarily linear direction, with positive effects on the economic-social sector, while development shows us how growth impacts on the society by increasing the standard of life." (Haller, 2012:66)

Drawing from these definitions, economic growth can be defined as the upward trend in real output per capita (good and services per person) of an economy over a period of time, measured by GDP per capita. According to Kuznets (1971), sources of long-term growth in an economy hinge on its productive potential. This refers to the labour supplied by the population, investment and capital accumulation, and the technological advancement of methods utilised by workers and machinery in firms. DeLong (2005) and Haller (2012) also allude to the fact that economic growth is centred on the increase in a country's provision of good and services to its population based on its productive capacity, which can be in the form of structural and institutional adjustments as well as technological development over a period of time. DeLong (2005) goes on to classify components that generate differences in economic growth rates of economies into capital intensity and labour efficiency. He states:

- "First, differences in the economy's *efficiency of labour* – how technology is deployed and used to increase the amount of output a worker can produce, even with the same amount of capital.
- Second, differences in the economy's *capital intensity* – how large a multiple of current production has been set aside in the form of useful machines, buildings and infrastructure to boost the productivity of workers, even with the same technology or organization." (De Long, 2005:3)

These two groupings are at the core of the Solow growth model, which is the standard model used to explain how an economy grows. This arises due to investment and saving, labour force growth, technological advancement and social improvement. This eventually impacts the output per worker of an economy and subsequently, the standard of living of the population. An understanding of the Solow growth model is important in order to then understand how external debt either boosts or weakens economic growth.

2.2.1. Solow growth model

The famous Nobel Prize in Economics winner, Robert Solow, proposed a model of economic growth, which has become known as the Solow growth model. The economic variable at the heart of it is labour productivity. The effects on economic growth are represented by the movement of

the equilibrium position from one point to another. The model also captures the effect of investment on standards of living of people in the long run (Solow, 1956).

The following breakdown of the model is highlighted by Ejigayehu (2013) following the work of Solow. The following discussion will shed light on this theory. The key assumptions underpinning the Solow growth model are as follows: (i) workers collect a wage; (ii) consumers always save a fixed proportion of their income and thus invest a fixed amount of their income; and (iii) the economy is closed, hence there are no taxes or government intervention (Ejigayehu, 2013). Drawing from these assumptions, the three inputs to the model are as follows:

1. Labour supply

The population provides the necessary labour supply for firms and grows at a rate, n, so:

$$n = \%\Delta N_{t+1} = \frac{N_{t+1} - N_t}{N_t} \Rightarrow N_{t+1} = (1+n)N_t \quad (1)$$

where N_t is the population size and the labour supply as people are all assumed to be employed and working.

2. The firm output per capita

The firm produces aggregate output at a rate that follows the Cobb-Douglas production function:

$$Y_t = AK_t^{\alpha} N_t^{1-\alpha} \quad (2)$$

where Y_t is the aggregate real income/output in period t, K_t is the capital stock and $AK_t^{\alpha} N_t^{1-\alpha}$ is the aggregate capital stock of the population size *N* at period t. A is the total factor productivity capturing the effect (level of technology, political stability, property rights protection) of an economy's production and market and α represents the shares of capital and labour respectively as they must add up to 1.

Thus, the per capita output derived from the aggregate real income is:

$$\frac{Y_t}{N_t} = \frac{AK_t^{\alpha} N_t^{1-\alpha}}{N_t}$$

Simplified,

$$y_t = Ak_t^{\alpha} \tag{3}$$

where y_t is output per capita and is given as $\frac{Y_t}{N_t}$, and where k_t^{α} is the per capita capital stock and is given as $\frac{K_t^{\alpha} N_t^{1-\alpha}}{N_t}$.

3. The Consumers:

On the other hand, as per the assumptions, the consumer will save a portion of their aggregate income(s) and consume the remainder, meaning that in a world with no government intervention (i.e. no taxes) or trade (imports or exports):

$$S_t = sY_t \text{ and } C_t = (1-s)Y_t$$
$$Y_t = C_t + S_t \tag{4}$$

where C_t is total consumption and S_t is aggregate savings (Acemoglu et al, 2005).

According to Solow (1956), economic growth is seen by a change in the standard of living of people, which in this model is represented by an increase in per capita capital. The capital stock per capita grows but at a decreasing rate and eventually converges to zero. This is called the long-run steady state value (k^*) and is calculated as:

$$k^* = \left(\frac{sA}{n+d}\right)^{1/(1-\alpha)} \tag{5}$$

where d is the depreciation rate (Acemoglu et al, 2005)

From this equation it can be seen that economic growth increases when the population growth rate (n) decreases or the savings rate (s) increases. However, with regards to the savings rate, although a higher value generates more capital per capita, which can then be used to produce output, a continuous increase in the rate cannot always lead to a higher level of per capita consumption. That is if the population is consuming very little of the large amount of output that is being produced (DeLong, 2005). Thus, there is a trade-off between saving and consumption – a higher savings rate means less consumption but supports greater long-run capital accumulation, which in turn, results in a higher steady state income. Consequently, there is an optimal level of savings rate

which will generate positive economic growth by optimising the steady state per capita consumption. This is known as the golden rule.

Mixon and Sockwell (2007) highlight that the Solow growth model is of paramount importance in explaining the long-run behaviour of different economies. Through the manipulation of savings strategies by policymakers, capital per capita can be maximised in pursuit of the golden rule steady state. Keita (2016) gives evidence that the technological changes and growth experienced in South Korea, Taiwan and Japan can all be traced back to the Solow growth model followed by policymakers in those countries. However, according to Ramsey (2005), the growth model used for African countries must also include an index of the quality of institutions and government. This demonstrates that the components of economic growth are complex and can easily change from country to country given the factors uniquely affecting each economy.

2.3. External debt

External debt, or foreign debt, refers to the current and not contingent liabilities of the country which are obtained by the government, businesses and individuals of that country from a foreign/ non-resident /external institution (World Bank, 2018). The debt requires interest and/or principal to be paid by the debtors at an agreed date in the future in the currency in which the funds were obtained. This study focuses exclusively on external debt.

2.3.1. Advantages of external debt

The principle benefits of using external debt are as follows:

1. Financing wars and post-war eras and contingencies

Governments view external debt as an emergency source of income. Government expenditures are financed from tax revenues, which in times of war or emergencies, are not readily available or insufficient (Weiss, 2007). Hence external debt provides debt relief in such situations. For example, the war of the Triple Alliance, the Gulf war and the Vietnamese war were all financed extensively by external debt. In fact, Sicotte and Vizcarra (2009) allude to the fact that wars create the need for governments to seek debt as it is a quick way to raise emergency funds.

Further to this, wars have devastating effects on the economy of the affected country as well as the social well-being of its citizens. Infrastructure is often destroyed, and farming activities interrupted, which significantly affects the production activities of a country. This, in turn, lowers the standard of living of citizens. Hence, financial injections in the form of external debt can be used to assist ailing economies recover quicker (Saylor and Wheeler, 2017).

In instances where unplanned situations arise, there ought to be some funds to cater to the need. Such include natural disasters, which will require immediate attention and financial input. Thus, external debt may act as contingent financing in a country. Koetsier (2017) studies the fiscal effects of natural disasters. He concludes that the absence of this funding actually causes an increase in debt costs, as debt will be issued in an unplanned manner. Hence if there is an already existing contingency plan for natural disasters, extra costs are avoided.

2. Funding development projects

Governments may resort to external debt funding for development projects as they require capital funds that may not be available from domestic sources only. Osuagwu and Orbunde (2015) highlight that in Nigeria, many development projects have been funded by external debt e.g. mineral exploration, communication and transport, rural and urban development, tourism and agricultural activities. In particular, they cite the example of the railway construction which cost the country US$28 million, with the funding raised from international capital markets (Osuagwu and Orbunde, 2015).

2.3.2. Disadvantages of external debt

While external debt provides an important source of funds for businesses, and especially governments, there are downsides to the use of external debt as a source of finance.

1. Borrowing psychology

Debt is funding borrowed today to be repaid later. This means there is a bias that firms and governments will be able to repay later which may cause the underestimation of the downside risk of default. Borrowers may become over-confident in calculating interest rates and repayment terms

which may lead them to agree to terms that are not sustainable for them. This will affect their ability to repay debt efficiently (Pettinger, 2016).

2. Lender manipulation

Some lenders have become manipulative in the way they avail funds to borrowers. The fact that borrowers have the potential to default may cause lenders to lend regardless as they may have interest in the borrower's assets when default ensues (Pettinger, 2016). An example of this is the takeover of national assets in the China-Zambia debt relationship. Chinese companies, despite being cognisant of the fact that Zambian parastatals have a history of defaulting on debt, still continue to grant debt. "A major worry of the IMF and US is that China's Belt and Road Initiative (BRI) strategy is first to encourage indebtedness, and then to take over strategic national assets when debtors default on repayments" (Lusakatimes.com, 2018). China has also taken over or is in the process of taking over the state-owned radio and television channel ZNBC, as well as the state electricity company Zambia Electricity Supply Corporation (ZESCO).

2.3.3. External debt and the original sin hypothesis

An important concept in the discussion of external debt in DCs is that of 'original sin'; a term put forward by Eichengreen, Ricardo and Panizza (2003) to refer to the inability of DCs to borrow in their own currency. Eichengreen and Hausmann (2005:5) give the following interesting statistics of the disparities in denominations of debt:

> *"At end of 2001, according to the US Treasury, Americans held $84 billion of developing country debt, but only $2.6 billion was denominated in the currencies of the developing countries in question. Of the $648 billion in overseas debt held by Americans at the end of 2001, 97 percent was denominated in 5 currencies: the US dollar, the euro, the British pound, the Japanese yen and the Canadian dollar. Of the $434 billion of debt securities issued by developing countries in international markets that was outstanding on average between 1999 and 2001, less than $12 billion was denominated in the currency of these countries."*

The study of Hausmann and Panizza (2003) identifies several factors which contribute to the inability of DCs to borrow in their domestic currency. The first of these is the level of GDP per capita in the country, with lower GDP resulting in a greater need to borrow in the foreign currency. Similarly, countries with weaker monetary credibility, as proxied by inflation, are seen to have greater funding in foreign currency. This arises because more volatile inflation poses additional risk and therefore makes lenders less willing to lend in the DCs local currency. Allied to this, more capital controls also result in higher original sin among the countries included in the study. Eichengreen et. Al. (2003) identified that the accumulated stock of debt also plays a role in the ability of the country to borrow as too much debt can result in the inability to service the debt and ultimately default. This issue is discussed further in Section 2.4.2. The exchange rate and external borrowing are also inextricably linked, with fixed exchange rate regimes typically allied to higher levels of original sin than floating exchange rate systems (Eichengreen et al , 2003).

The findings of Ross et al. (1998) also aid in understanding why many DCs are forced to borrow abroad. They studied ten low income DCs and found that the following factors made DCs unattractive borrowers: (i) politics (social strife or civil war); (ii) debt management that is inadequate; (iii) external factors beyond the control of governments such as oil price shocks or weather; and (iv) a lack of structural reforms and macroeconomic adjustments. Due to these factors which make DCs unattractive borrowers, ACs attempt to insulate themselves from such risks by lending in foreign currency rather than the domestic currency of the DC.

The inability of DCs to borrow in their domestic currency has various consequences not only for the issuing countries but for the lending countries as well, two of the most prominent being capital transfer failure and currency mismatch. In an ideal world, capital should flow from capital-rich (AEs) to capital-poor (DCs) countries which offer higher marginal returns to capital. But, as Lucas (1990) ascertained, this does not occur – a phenomenon that has become known as the 'Lucas paradox'. One explanation for the failure of this capital transfer is original sin (Eichengreen et al., 2003). Shocks emanating from the international environment impact the ability of DCs to service their foreign currency denominated debt because such shocks typically result in a depreciation of the real exchange rate. This depreciation means that the purchasing power of the domestic output is reduced over foreign claims (Eichengreen et al., 2003). Given that foreign lenders are aware of

the effects of such shocks on the ability of the DCs to repay the debt, they become reluctant to lend. This upsets the cycle of capital transfer therefore causing capital transfer failure and preventing the flow of funds from capital-rich to capital-poor countries (Eichengreen et al., 2003).

A second possible implication of original sin is a 'currency mismatch'. Eichengreen et al (2003:13) define a currency mismatch as "differences in the values of the foreign currency denominated assets and liabilities on the balance sheet of households, firms, the government and the economy as a whole". For banks, the currency mismatch is the difference in the value of liabilities and assets denominated in foreign currency while for firms, it is the relationship between net foreign currency denominated liabilities and the net present value of domestic currency denominated cash flow. Therefore, at the national level, the aggregate currency mismatch is the net debt to foreigners denominated in foreign currency. When such a mismatch occurs, the country will experience an adverse balance sheet effect if there is a depreciation of the real exchange rate, as this causes the value of the country's external net debt in terms of the value of its national output to rise (Eichengreen et al., 2003).

When banks, firms or the government of a DC suffering from original sin borrow externally, they incur gross foreign debt denominated in foreign currency and thus expose themselves to a currency mismatch. This leads to severe financial consequences if the real exchange rate depreciates as has been seen recently in many African countries such as Ghana and Nigeria. But, a currency mismatch only occurs if the country does not have sufficient foreign reserves. Many DCs try to protect themselves from the adverse consequences of original sin, resulting from a depreciation in the real exchange rate, by accumulating foreign reserves. Unfortunately, this may not always be possible depending on other economic circumstances and the associated opportunity costs as the yield on reserves is typically less than the cost of funds (Eichengreen and Hausmann, 2005). For example, with the fall in the prices of oil in Nigeria in 2016, their financial reserves fell exposing them to the inability to service their external debt (Sayedi, 2016). Hence when firms and governments borrow in foreign currency as a result of original sin, they are likely to be exposed to currency mismatch and the accompanying ills.

2.4. External debt and economic growth

Following Oleksandar (2003), the relationship between external debt and economic growth identified in the extant literature can be divided into three categories: a positive relationship where more debt leads to greater growth, a negative relationship where more debt harms growth and a non-linear relationship which combines the preceding two. Each of these arguments will be examined in turn.

2.4.1. Positive impacts

For countries with relatively low levels of accumulated debt, and not close to the golden rule of savings as per Solow's growth model, external debt is argued to positively affect economic growth through capital accumulation and total factor productivity (TFP).

Firstly, if an economy on its own fails to produce sufficient capital per capita, external debt can be used as a substitute for capital *(k)* which represents capital stock or investment according to the Solow growth model, as discussed previously. Furthermore, if a deficit exists in a country's current accounts, external debt represents an option for capital inflow to enable economic activity, and enhance production capacity by improving the balance of payments. Therefore, external debt should have a positive impact on economic growth by providing the necessary capital and investment while also providing necessary foreign currency for the country (Pattillo et al., 2004). Pattillo et al. (2004) also argue that when external debt is kept at manageable levels and any distortionary taxes are removed, investors will have an appetite to invest repeatedly as a result of the expectation of high returns when the borrowed funds are repaid in time.

Secondly, external debt may contribute to economic growth by improving TFP. According to Riffat and Munir (2015), TFP refers to the efficiency of all the inputs of a production process. When external debt is injected into the system either at the firm level or at the economy level, the efficiency of inputs is enhanced as a result of the enabling strength of available funding, which thus contributes to economic growth (Riffat and Munir, 2015). Further to this, it creates an environment conducive to longer-term investment and thus provides growth potential.

In light of this theoretical argument, external debt is viewed as an important financing option for funds in EMEs and FMEs because it supports capital accumulation and TFP, which in turn result in economic growth (Chenery and Strout, 1966; Krugman, 1988; Sachs, 1989; Ewubare and Ogbuagu, 2015).

2.4.2. Negative impacts

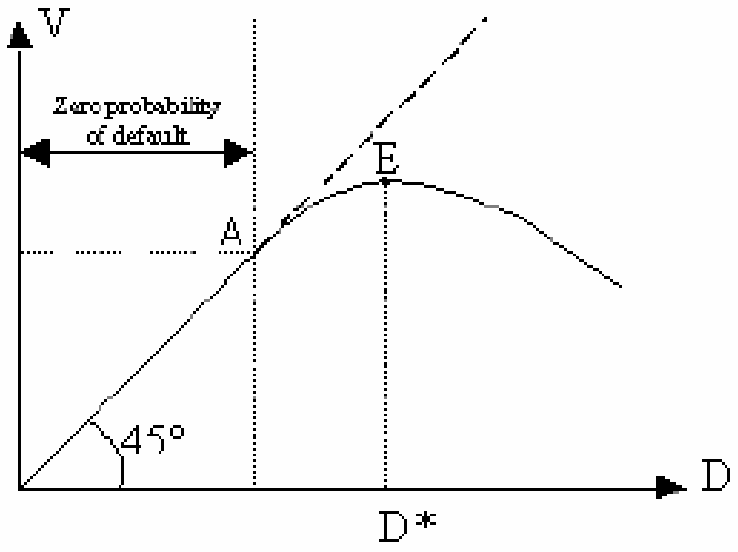
On the other hand, for countries with a stock of accumulated debt, debt is argued to impede economic growth, based on the theory of debt overhang (Krugman, 1988; Sachs, 1989). This concept is also a significant effect of original sin and currency mismatch previously mentioned. Krugman (1988:254) defines debt overhang as "the presence of an existing, inherited debt sufficiently large that creditors do not expect, with confidence, to be fully repaid".

The 'Debt Laffer Curve' was introduced by Sachs (1989), which presents this argument diagrammatically; that is, that high debt stocks are associated with a lower probability of debt service and debt repayment. This is shown in Figure 2.1 below. In the diagram, the expected debt repayment (V) is measured on the vertical axis, while the debt stock (D) of the country is measured on the horizontal axis. The line from the point of origin to A, demonstrates the range over which an increase in debt is associated with an increase in the expected debt repayment. This implies that the probability of default will be zero. From points A to E, however, the increase in debt stock is associated with an increase in the expected debt repayment, but it increases at a decreasing rate. The probability of default thus begins to rise but at manageable rates such that debt management strategies can typically be employed to successfully reduce external debt (Krugman, 1988). D* represents the maximum value of the debt stock beyond which any further increases in debt will be unsustainable, and will result in a decrease in the expected debt repayment and hence an increase in the probability of default.

Beyond point D*, the country is said to be on the wrong side of the curve. Resources which would have been used to develop the economy are instead directed to debt service and debt repayment. Further to this, the high probability of default is likely to disincentivise future investment (Patillo et al., 2004). In addition, fiscal adjustments (such as increased taxes) that are required to meet the debt payments will curb current consumption, while also lowering investment efficiency and

productivity (Oleksandar, 2003). These actions will thus contribute to a decline in economic growth. It is therefore clear that for countries with an accumulated debt stock, further increases in debt are likely to have negative repercussions for growth.

Figure 2.1: Debt Laffer curve



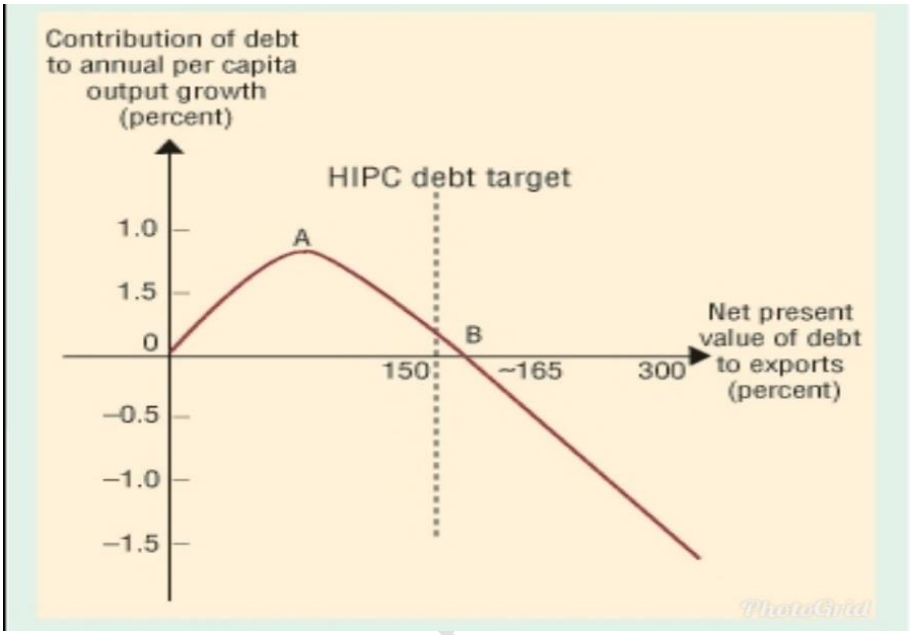
Source: Oleksandar, 2003:6

2.4.3. Bi-directional relationship

Patillo et al. (2002, 2004) were the first scholars to propose a non-linear relationship between external debt and economic growth. The graphical depiction of the relationship is shown in Figure 2.2. The vertical axis measures the contribution of debt to annual per capita output growth and the horizontal axis, the stock of external debt in the economy (which is measured by the ratio of the net present value of debt-to-exports). A positive relationship between the two is evident from the origin to point A, meaning that within this range of the debt-to-export ratio, an increase in debt will result in an increase in the contribution of debt to GDP per capita. Beyond this point however, an increase in the net present value of the debt-to-export ratio is harmful to economic growth as it reduces the contribution of debt to annual per capita output growth. As such, this gives rise to a change in the direction of the straight line thus forming an inverted curve (Krugman, 1988). If the debt stock continues to accumulate beyond point B, economies continue to borrow beyond their means. Given this, as the net present value of debt-to-exports rises, it causes the contribution of

debt to annual per capita output growth to become negative. Countries in this territory are typically labelled as Highly Indebted Poor Countries (HIPC) and seize to grow.

Figure 2.2: GDP per capita vs debt to exports



Source: Patillo et al., 2002:44

The absence of a debt overhang allows for foreign currency to be used in productive investments which improves investor sentiment, and improves its economic growth performance as seen in the first part of the curve. This mirrors the positive relationship argument put forward in section 2.4.1. Further to this, the evidence from the graph above shows that the "marginal effect of external indebtedness on efficiency becomes negative when its share of the total external debt exceeds an optimal threshold" (Adeve, 2015:35). Hence, similar to the argument put forward in section 2.4.2, debt overhang can cause harmful effects to economic growth as resources are directed towards debt servicing at the expense of development, the high probability of default disincentivises further investment, and high taxes that may be introduced curb consumption and lower productivity. Therefore, it becomes crucial for EMEs and FMEs to establish thresholds in order to keep external debt at levels that result in debt positively contributing to economic growth.

2.5. Empirical evidence of the external debt and economic growth relationship

The majority of the studies on the debt-economic growth relationship have been performed on DCs and EMEs, with very little attention given to AEs. Some of the developing country studies do include FMEs as part of their sample although they are not analysed as a unique group of countries. Some research on individual countries that are classified as FMEs has been done, which provides information as to whether the debt-growth relationship differs among the pre-emerging markets compared to their emerging market peers or DCs as a whole.

One of the seminal empirical studies of the relationship between economic growth and external debt is that of Fosu (1996), who examined developing SSA countries over the period 1970-1986. Fosu (1996) found that, on average, annual economic growth is lower by 1.1% for high debt countries, where debt is measured either as debt service or debt outstanding. As discussed in section 2.4.1, debt can affect growth through two main channels namely capital accumulation and total factor productivity. Fosu (1996) found capital accumulation to be the major channel through which external debt curtails economic growth. He goes on to explain that there are crowding out effects which also occur as a result of using external debt meaning local investment is discouraged.

The rising external debt levels in five SSA countries raised an alarm when studied by Shittu et al. (2018). It was concluded that external indebtedness has the effect of crowding out investments in the economy as debt becomes expensive to service. Furthermore, taxes may also rise causing investors to move their funds out of economies (capital flight). The combination of these factors, triggered by external indebtedness, reduces economic growth. The results of Shittu et al. (2018) are thus consistent with the earlier work of Fosu (1996) on SSA countries. However, Ndoricimpa (2017) studied the debt threshold effects of economic growth in Africa and found support for a non-linear debt-economic growth relationship. At low levels of debt, the effects were at least neutral or growth enhancing whereas at high levels, the effects of additional debt were detrimental to growth.

Weeks (2000) also found a negative relationship between external debt and GDP growth when he reviewed 18 Latin American countries in five-year intervals over the period 1970-1994. In the study, a 1% increase in external debt service caused a 1.6% decrease in the long-run GDP per capita (Weeks, 2000). Shabbir (2013) examined 70 DCs over the period 1976 to 2011 and found

that an increase in the stock of external debt, decreased the ability of government to service external debt liabilities. Consistent with the findings of the Solow Growth Model, Shabbir (2013) finds that debt reduces capital formation which further dampens economic growth.

The relationship between external debt and economic growth in the Asian developing country of Pakistan was studied by Ali and Mustafa (2013). Over the period 1970 to 2002, they also documented that external debt has a negative impact on economic growth while human and physical capital positively impact growth. The evidence thus supports the debt overhang hypothesis for Pakistan (Ali and Mustafa, 2013). Filiz and Salih (2016) analysed the effects of fixed capital and debt on economic growth in DCs in central Asia over the period 1993 to 2011. Using panel data estimation, their findings shows that contrary to theory, external debt had an insignificant relationship with economic growth for these economies. The contrast between the results in the studies above reflects the different effects of debt in Asian countries.

Studies of individual countries by Ali-Ebraheem (2016), Lopez and Nahon (2017), Konsulov and Kabaivanov (2018), Bidzo (2018) and Al-Tamimi and Jardar (2019), who examined Kuwait Argentina, Bulgaria, Gabon and Jordan respectively, all found a negative debt-growth relationship. Poor economic policies, poor debt management and debt structures continue to impede the effective use of debt in these countries.

Though few, some studies have found evidence of a positive effect of external debt on the growth rate of GDP per capita of countries. Both Abbas and Christensen (2007) and Moore and Chrystol (2010) reached this conclusion after examining DCs using a meta-analysis methodology. Their explanation was based on the increase of a nation's productive capacity due to the increase in external debt. Moore and Chrystol (2010) also concluded that policies which govern resource allocation pertaining to external debt differ across countries. However, they also highlighted that such studies would be more effective and robust if countries were studied individually.

While the studies of Abbas and Christensen (2007) and Moore and Chrystol (2010) focused on DCs, Fincke and Greiner (2015) also found a significantly positive relationship between external debt and per capita GDP growth rate when analysing EMEs. Fincke and Greiner's (2015) sample included eight EMEs namely Brazil and Mexico from Latin America; India, Indonesia, Malaysia

and Thailand from the Asian markets; South Africa from the African continent; and Turkey from Europe. Although some of these eight countries were affected by the European debt crisis of 2010, individually, they all managed to maintain high growth rates and investment potential. In light of their findings, Fincke and Greiner (2015) argue that these countries are transitioning, which means that they are characterized by high growth rates and an increase in investment, that also contributes to an expansion in infrastructure.

Schclareck (2004) found no evidence to support the non-linear (inverted U-shape) relationship between external debt and growth when he studied 59 DCs in the period 1970-2002. Further to this, for the developing countries studied, there was evidence that the negative external debt-economic growth relationship arises through capital accumulation as opposed to total factor productivity. In contrast, the results of Patillo et al.'s (2002, 2004) studies both supported the existence of an inverted U-shaped curve across 93 DCs over the period 1969 to 1998. Their findings supported the debt 'Laffer curve' proposed by Sachs (1989). In the later study, Patillo et al. (2004) extended their study to further investigate the critical threshold where the deleterious effects of the debt-to-GDP ratio commence. A maximum external debt-to-GDP threshold of 35% to 40% was observed. Clements et al. (2003) identified a similar external debt threshold of approximately 30% to 37% when they examined 55 low income countries over the period 1970-1999. Fofana (2018) also found a non-linear relationship between debt and economic growth with a higher threshold level of 42.9% of GDP in Cote d'Ivoire. Beyond the threshold level, debt begins to impede economic growth. Cote d'Ivoire's current level of debt has reached 48.3% and thus Fofana (2018) calls for the attention of authorities for more cautious economic policies.

In one study of developed countries, Checherita and Rother (2012) examined the relationship between economic growth and external debt over the period 1970 to 2008 in 12 European countries namely, Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. There was a non-linear/concave relationship between external debt and economic growth with a 90% to 100% threshold turning point. This is explained by debt build up/debt overhang. Debt overhang thus caused the debt-to-GDP ratio to increase to levels that became unsustainable for European governments. Thus, in the Euro area investigated by the study, economic growth slowed down through debt accumulation.

Some of the empirical evidence disregards the existence of a relationship between external debt and GDP per capita growth, while some evidence points at only a linear (negative or positive) relationship. However, the majority of the studies examining DCs and EMEs find a negative non-linear (inverted U shape) relationship between external debt and per capita GDP growth. This is in line with the conclusions also reached by Pattillo et al. (2004). Capital accumulation was also found to be the most popular channel through which external debt negatively affects economic growth, when compared to total factor productivity. This suggests that capital stocks/investments are directly weakened when countries issue external debt with the intention of improving economic growth. However, the threshold levels do not follow any set pattern or level and this may be because studies done focus on individual countries as well as a group of selected countries (i.e. DCs, SSA or EMEs).

2.6. Summary

The economic theory supports an increase in GDP per capita emanating from labour and production intensity. Unpacking these two, the more productive a population is, the higher the output per capita. Hence to enable productivity, investments ought to be injected in order to begin the cycle. Thus, investments also come in the form of debt; debt may be a substitute for investments. With this, economic growth and external debt have a relationship. Literature has mixed results when it comes to the nature of the relationship between these two variables. With this, chapter three will lay out the data collection methods used, the methodology and the estimation technique used in order to investigate this relationship in FMEs.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

As indicated in chapter one, the purpose of this study is to investigate the effects of total external debt on economic performances of FMEs. This comprises two objectives: (1) testing whether total external debt has a linear relationship with economic growth, and (2) determining the maximum possible threshold for FMEs when issuing external debt. To investigate these research objectives, a quantitative approach was used to gather data and panel data was collected on eight FMEs for the period 1991 to 2016. In this chapter, the details of the sample size, time period and the estimation method are discussed.

3.2. Methodology

A panel dataset was collected, the details of which are described in the following section. The empirical framework adopted in this study for the analysis of the panel data was informed by Sasabuchi (1980), Lind and Mehlum (2010) and Megersa and Cassimon (2015).

3.2.1. Theoretical model

To determine the nature of the relationship between total external debt and GDP growth in FMEs, a typical economic growth regression model will be estimated, as per Megersa and Cassimon (2015), which incorporates total external debt as an explanatory variable as follows:

$$Yg_{it} = \alpha + \beta Debt_{it} + \lambda(\text{Debt}_{it})^2 + \eta_z z_{it} + \varepsilon_{it} \quad \text{where } i = 1 \ldots . n \tag{6}$$

Yg represents economic growth as the difference in the natural log of GDP per-capita (Y), and debt represents the total external debt to GDP ratio. The squared debt term represents a quadratic form variable useful to make inferences about the possible existence of a non-linear relationship (Checherita and Rother, 2010). **ε** is the random error, *z* represents a vector of control variables, which, for the purpose of this study are population growth, the real effective exchange rate, capital formation and trade. Control variables are included in regression analyses and held constant to allow the change in the independent variable observed (external debt) to be as a result of a change

in the dependent variable (economic growth) only. The justification for the choice of these control variables is provided in section 3.3.2.

3.2.2. Correlation analysis

Prior to estimating the model, a correlation analysis will be undertaken to measure the direction, association and strength of the relationship between the variables (Laerd Statistics, 2016); that is, how closely the two variables move together (Asuero et. al, 2006). There are three basic assumptions which underpin the computation of the correlation coefficient with the failure to meet these causing invalid results. The four assumptions are:

- The two variables should be continuous.
- There must be a linear relationship between the two variables.
- There should not be any significant outliers. This is seen when the mean and the median are not too far apart.

It is crucial to include correlation analysis in this study because explanatory variables included may be highly correlated to each other, further causing multicollinearity. Multicollinearity is when explanatory variables in a regression model are correlated. The precision of the coefficients is largely reduced in the presence of multicollinearity, which has ripple effects of weakening the statistical power of the regression model. Consequently, the p-values used to detect significance of coefficients in the regression model become inaccurate (Frost, 2018). To add on, estimates of coefficients may swing wildly, which may cause coefficients to become very sensitive to small changes in the model. The potential negative effects of multicollinearity are the reason why the inclusion of correlation analysis in this study is important.

With this, the area of focus will be the correlations between explanatory variables and external debt in order to assess the extent of correlation in the model. The results here will ensure the strength of the model in testing the hypothesis of this. A weak correlation or the absence of correlations between variables will validate the analysis.

In this analysis, the correlation coefficient takes values from -1 to 1. If it is -1, there is a perfect negative correlation between the two variables, if it is 0, there is no correlation and when it is 1, there is a perfectly positive correlation. However, Cohen (1988) further defines and breaks down the figures given above (-1 to 1) to give a clear picture of the nature of the correlation. Hemphill

(2003) also uses Cohen's (1988) definitions when interpreting correlation coefficients in his study. The table below was followed in interpreting the output, based on Cohen (1988).

Table 3.1: Correlation analysis

Coefficient Value	Strength of Association
0.1 < | *r* | < .3	Small/weak correlation
0.3 < | *r* | < .5	medium/moderate correlation
| *r* | > 0.5	large/strong correlation

|*r*| is the absolute value where e.g |0.5| means *r* > 0.5 and *r* < -0.5.

3.2.3. Estimation technique

The system GMM is a dynamic panel data model developed by Arellano and Bover (1995) and Blundell and Bond (1998). This approach has been used by other scholars in studying the linear and non-linear relationship between debt and economic growth. For example, Abbas and Christensen (2007) used this model, regressing per capita real income growth on linear and non-linear debt terms and a set of controls. Mbate and Elhiraika (2014) also uses this model in assessing the export diversification in Africa. Hence in investigating the objectives with regards to external debt, the system GMM is used for this study.

The system GMM estimator controls for:

1. endogeneity of lagged variables given that there is likely to be correlation between the explanatory variables and the error terms
2. omitted variable bias
3. unobserved panel heterogeneity (Blundell and Bond, 1998)

To demonstrate the channel through which endogeneity presents itself in the regression model, the following equation is given.

$$lnY_{it} = \phi lnY_{it-1} + \beta X'_{it} + (\eta_i + \varepsilon_{it}) \quad (7)$$

Equation (7) is a lagged form of (6) showing the GDPPC i.e (lnY_{it}) as a dependant variable and GDPPC lag i.e (ϕlnY_{it-1}) as an explanatory variable. This creates a persistent dependant variable

meaning that both these GDPPC variables are likely to be correlated through the error term as a result of lagging. Hence, this displays the standard first-differenced GMM estimator of Arellano and Bond (1991). The first differenced GMM estimator has a weakness of having lagged levels of the series correlated with subsequent first differences, which causes weak instruments (De Vita and Khine, 2016). Further, this causes the variance of the coefficients to increase, generating biased estimates, and the persistence of the dependant variable thus bringing about endogeneity in the independent variable through the error term.

With this, the system GMM is developed from first differences GMM as it is more useful compared to the first-differenced GMM. It includes a system of two equations built to eliminate the effect of lagging. The original equation is expressed in level form with first differences as instruments as in *equation 2*. The second equation also known as the transformed equation, is expressed in first differenced form with levels as instruments thus using a greater number of moment conditions (Roodman, 2006). To do this, instruments for the lagged dependant variable are constructed from the second or third lag of the dependant variable in the form of lagged levels. Hence, the lags (first or second lag) of the dependant variable will become highly correlated with the lagged dependent variable but not correlated with the composite error process (Advanced Econometrics, 2007). By so doing, endogeneity is corrected by introducing more instruments to improve efficiency and transforming the instruments to make them uncorrelated (exogenous).

A critical assumption of the regression model is that the explanatory variables are not correlated with the error term in the equation, meaning that the explanatory variables, termed instruments, are exogenous (Sorensen, 2012). In the event that this assumption is violated, and the instruments are endogenous, that is, correlated with the error terms, then the regression output is invalid.

3.2.4. Hypothesis tests

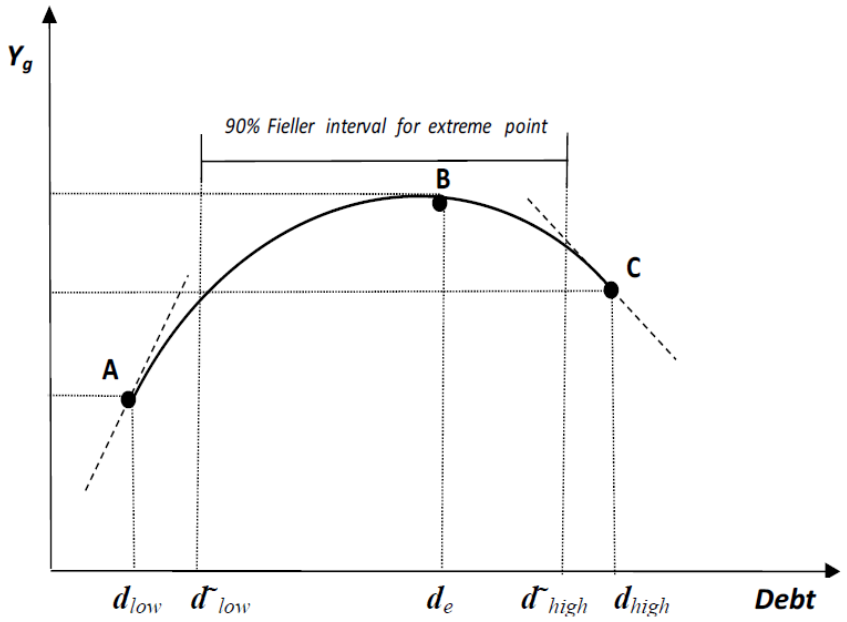
To test for a linear relationship between total external debt and GDP growth, as per the first objective of this study, a t-test of the significance of the coefficient on total debt in (1) will be conducted with the following hypothesis:

H_0: $\beta = 0$
H_1: $\beta \neq 0$.

If the null hypothesis is rejected, it can be concluded that the relationship between economic growth and total external debt is linear. The null hypothesis is rejected when the p-value of the slope coefficient is significant.

Moving onto inferences on the second objective to investigate and confirm the possibility of the relationship between total external debt and economic growth **being an inverted U-shaped**. Mergesa (2015) derives an inverted U shape debt growth relationship based on an equation similar to *equation 6.* In figure 3.1, economic growth and debt as the x and y axis, *d* low and *d* high are lower and upper bounds of the inverted U-shape, while the *d'* low and *d'* high are 90% Fieller (1954) upper and lower interval of the extreme point. The slopes A and C represent the lowest and highest points on the Inverted U-shape within the lower and upper bounds. B will be the threshold/maximum level, a point where debt seizes to have positive impacts on economic growth.

Figure 3.1: Economic growth and the inverted U shape debt-growth relationship



Source: Megersa, 2015:6

For this study, if it is to be assumed that there is one extreme point to be established, for an inverted U-shape to exist, the slope of the curve should be positive at the beginning and negative at the end. Hence in Figure 3.1 for the given debt values (interval of d'_{low} and d'_{high}), the slope ought to be positive at point A and negative at point C.

To test for the existence of the inverted U –shape, the Lind and Mehlum (2010) U test was carried out using the following hypothesis.

H_0: Monotone or U shape exists
H_1: Monotone or U shape does not exist thus Inverse U shape exists

The null hypothesis explains that the relationship between the two variables is monotone, or U-shaped, thus no inverse relationship exists. Also, failing to accept the alternative hypothesis confirms the inverse U-shape relationship. This implies that debt initially increases economic growth but changes in direction when debt is increased, thus reducing economic growth. The point where the curve changes in direction, the extreme point, is the point whose p-value is tested for significance. A significant p-value gives evidence to reject the null hypothesis that the relationship is monotonic, in support of the alternative hypothesis that the relationship is non-monotonic. If the alternative hypothesis is accepted, the slope should be positive at d_{low} and negative at d_{high}. This implies an increase on the left-hand side of the interval and/or a decrease on the right-hand side. This then creates an inverted U-shape with an extreme point at the apex of this curve, point B (see point B on Figure 3.1).

To ascertain this threshold level, the Fieller (1954) method is used in this study to compute the estimated extreme value within an interval i.e dl_{ow} and d_{high}. Fieller (1954) proposes that the estimated extreme value (threshold) is calculated by the parameters from equation 1:

$$f' = -\frac{\beta}{\lambda} \tag{8}$$

3.2.5. Diagnostic tests

In this study, two diagnostics tests will be used in the system GMM framework. The first is the Arellano test for serial correlation in the error term and the second is the Sargan test for over-identifying restrictions.

The GMM model relies on the assumption that the residuals of the differenced equation exhibit no serial correlation (Arellano and Bond, 1991). In order to ensure the robustness of the results from the regression model, diagnostic tests are typically performed to assess whether the model satisfies

the assumption of the absence of serial correlation, given by Arellano and Bond (1991). Violation of this assumption weakens the explanatory power of the p-values of the explanatory variable coefficients and makes the model invalid. The Arellano-Bond test of serial correlation examines the error terms of the differenced equation at the first order, AR(1), and at the second order, AR(2). The null and alternative hypotheses are as follows:

H_0: First order [AR(1)] serial correlation of the error term of the differenced equation does not exist
H_1: First order [AR(1)] serial correlation of the error term of the differenced equation exists.

And,
H_0: Second order [AR(2)] serial correlation of the error term of the differenced equation does not exist
H_1: Second order [AR(2)] serial correlation of the error term of the differenced equation exists.

If the null hypothesis is rejected, serial correlation exists. It is usual for the test of first order, AR(1), serial correlation to reject the null hypothesis and conclude that serial correlation exists. However, the test for second order, AR (2), serial correlation will detect autocorrelation in levels. The expectation is that the null hypothesis is not rejected and that serial correlation is absent, thus the assumption of the model is not violated (Mileva, 2007).

The Sargan test of over-identifying restrictions is a test which looks at the overall validity of the explanatory variables. If the instruments are valid, it means they are exogenous, that is, they are determined outside of the system. The hypothesis of the test is as follows:

H_0 : All instruments as a group are not endogenous
H_1 : All instruments as a group are endogenous

If the null hypothesis cannot be rejected, then it means that, as a group, all the instruments are exogenous and thus valid. P-values exceeding the conventional significance levels in the Sargan and serial correlation tests will mean that the model has valid instruments with no endogeneity as

well as no serial correlation in the error terms of the differenced equation. As such, this will validate the system GMM as a robust model for the panel data under study. Abbas and Christensen (2010) and Mergesa (2015) both used the system GMM model in their study analyses.

3.3. Data description

3.3.1. Sample and data period

Panel data was collected comprising the FME countries as the cross-sectional units, and annual observations for the period from 1991 to 2016 as the time-series. The time period of this study was informed by the availability of data. Using panel data reduces collinearity amongst explanatory variables and increases the degrees of freedom as a consequence of the large number of data points. This improves the quality of the model estimated as well as the analysis of the data compared to either cross-section or time-series only samples (Hurlin, 2018).

As mentioned in the preceding chapter, there is no one commonly accepted identification of FMEs. Thus, for the purposes of identifying the population of FMEs, some information from Andrikopoulos et al. (2014) was used. Thereafter, countries which had insufficient data on total external debt for the time period under analysis were excluded from the sample. The final sample comprises the following eight countries: Brazil, the Dominican Republic, Ecuador and Paraguay from the Latin American region; Nigeria and Morocco from Africa; and the Philippines and Malaysia from Asia. The IMF country-specific commentaries were examined to obtain insight into each of these economies. A brief review of some of the pertinent facts is provided below.

- In 2015 and 2016 Brazil experienced a severe recession. The country has since recovered after the Central Bank resorted to a successful fiscal consolidation which saw its real GDP grow by 1% in 2017, and it is projected to increase by 1.8% and 2.5% in 2018 and 2019 respectively. This is largely as a result of investment and domestic consumption. However, public debt reached 84% of GDP and is estimated to increase to 90% by 2023 (IMF, 2016a)

- The Dominican Republic faces moderate external debt coupled with slow inflation as a consequence of strong macroeconomic policies. Economic growth is expected to be 5.5% in 2018 from 4.6% in 2017. However, a shortage of electricity continues to be a stumbling

block for the economy which is exacerbated by increases in world oil prices. Other changes in international markets also have a negative impact on smaller markets such as that of the Dominican Republic (IMF, 2017).

- Ecuador has suffered from external shocks which have resulted in the weakening of its economy. The real effective exchange rate is overvalued which means that local prices of goods, priced in USD, are higher than abroad, thus discouraging exports and competitiveness. This has had ripple effects on the stability of the balance of payments and ultimately, the trade of Ecuador. Coupled with this, there is also a high deficit of the fiscal balance and thus, rising external debt. Supply-side reforms are needed to curb these economic vulnerabilities (IMF, 2016b).

- Despite high oil prices, Malaysia achieved high GDP growth in 2017 and this trend is predicted to continue in 2018, with growth forecast to be 5.8%, driven by exports and domestic demand. The gradual fiscal consolidation and accommodative monetary policy has been an anchor to the Malaysian real GDP growth (IMF, 2018a).

- Morocco's economy recovered in 2017 to achieve a growth rate of 4.4% GDP and public debt levels are reported to be sustainable. The current account deficit, which had followed an upward trajectory from 2010 to 2015, has been projected to decline moderately in 2017. This has allowed international reserves to settle at normal levels (IMF, 2018b).

- The success of Nigeria's economy hinges largely on international oil prices. Rising oil prices have caused an improvement of Nigeria's economic performance causing it to slowly move away from the recession it experienced in 2015. This has enabled foreign currency flows and the strengthening of foreign reserves. However, the recovery of oil-related sectors is yet to have positive effects on the inflation target which is out of range, as well as the ailing banking sector and the high unemployment rate (IMF, 2016c).

- Paraguay's trading region has generally been weak while volatile food prices have caused inflation. However, the economy remains resilient, even in the midst of a regional slowdown, due to accommodative macroeconomic policies (IMF, 2016d).

- The Philippines economy remains strong with 0.3% growth in GDP per capita forecasted for 2017. Economic indicators have improved ever since the financial crisis, with unemployment set to decline by 0.3% and the public debt-to-GDP ratio expected to remain on a declining trend (IMF, 2016e).

3.3.2 Data description:

The data used for this study was obtained from World Bank database and the World Development Indicators (WDI). Although the focus is on regressing external debt and GDP growth rate, control variables are introduced into the model to enable a robust investigation. The following table provides a brief description of these variables which will be used in the regression model in this study and the justification for the inclusion of the control variables follows Table 3.2.

Table 3.2: Variables used and their description

Variables name	Symbol	Variable Description
GDP per capita	GDPPC	GDP per capita in constant USD
Economic growth	LNGDPPC	GDP growth rate
Total external debt to GDP	DEBT	Total external debt to GDP ratio
Population growth	POP	Population growth (annual %)
Openness of the economy	TRADE	Trade as a % of GDP
Fixed capital formation	GFCAP	Gross fixed capital formation (% of GDP)
Exchange rate	REXR	Real exchange rate (index, 2010=100)

GDP per capita (GDPPC) is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars (World Bank, 2018). Economic growth is the

natural log of GDP per capita (LNGDP) to describe the annual growth rate of GDP per capita. This is the dependant variable of the model as in equation 6 above.

The focus is on ascertaining the effect of external debt on economic growth thus economic growth is proxied by GDPPC. Boarini et al, (2006), Diacon and Maha (2015), Hutchet-Bourdon et al, (2017) use GDPPC as a proxy for economic growth in their studies. Henderson et al., (2012) also used GDPPC to generate 'satellite data on lights at night'; a map of the globe from space as appears at night, thus depicting GDPPC for countries. The brighter and denser the lights, the higher the economic growth of the country.

The total external debt to GDP ratio, (DEBT) is calculated by dividing total external debt by current GDP. Total external debt is the sum of public, publicly guaranteed, and private non-guaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt (WDI Database Archives, 2017). This ratio is to be used to make inferences about a country's economic growth performance given its indebtedness (in terms of total external debt). Other studies which have used the total external debt to GDP ratio include Sachs (1985), Ayadi and Ayadi (2008) and Zaman and Arslan (2014). The study of the relationship between external debt and economic growth has produced mixed results across countries of varying levels of development, as indicated in chapter 2. Based on the empirical evidence, most of these studies (Fosu 1996, Shabir 2013, Tchereni et al., 2013, Adeve 2015, Pattillo et al, 2015) found a negative relationship between the two variables. Rahman et. al (2012) and Okoye et al. (2017) found positive relationships when they looked at individual FME countries, Bangladesh and Nigeria. With this, the results expected here are that there will be a positive relationship.

The population growth (POP) for year t is measured as the exponential growth rate in the midyear population estimates from year $t-1$ to t, expressed as a percentage (WDI Database Archives, 2017). The population estimate is based on the *de facto* definition of population, which counts all residents regardless of legal status or citizenship (WDI Database Archives, 2017). It is an important variable to consider because human capital enhances the production capacity of the nation according to Solow's growth model, as described in Chapter 2. A highly productive

economy increases more output, hence increasing economic growth. Klasen and Lawson (2007) and Guga et al. (2015) also include population growth in their studies as an explanatory variable for economic growth. However, empirical evidence shows that a negative relationship exists, and this is contrary to theory. Such studies showing a negative relationship include Simon and Da Vanzo (1980), Pattillo et al. (2002), Abbas and Christensen (2007). This study will therefore contribute to the empirical evidence of the relationship between population growth rate and economic growth in FMEs.

Gross fixed capital formation (GFCAP), (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, etc.); plant, machinery, and equipment purchases; and the construction of roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings (WDI Database Archives, 2017). According to the 1993 System of National Accounts (SNA) which is a standard system of national accounts, net acquisitions of valuables are also considered capital formation (IMF, 1993). Gross fixed capital formation measures the investment share, which increases capital stock and enhances economic output and eventually economic growth, according to the Solow growth model. Other studies which have included fixed capital formation as an economic growth explanatory variable include Panic (1967), Dritsakis et al. (2006) and Kanu and Ozorumba (2014). With regards to the nature of the relationship between economic growth and capital formation, a positive relationship exists, also based on the Solow growth model and other studies such as Abbas and Christensen (2007), Akram (2015) and Adeve (2016). Thus, a positive relationship is also expected.

Trade (TRADE) is the sum of exports and imports of goods and services measured as a share of GDP (WDI Database Archives, 2017). A positive external trade balance plays a crucial role in promoting the efficient allocation of resources through technological advancements which will be disseminated in the country. This exposure of the economy to other ways of conducting business and production methods fosters competition in markets and subsequently positively impacts growth (Grossman and Helpman 1991). Empirical evidence supports the positive impacts which trade displays and some of these studies include Mehar (2013) and Jonsson (2016). Hence in this study, trade is expected to have a positive relationship with economic growth.

The real effective exchange rate (REXR) is used as the measure of the exchange rate and is computed as the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs (WDI Database Archives, 2017). The exchange rate is used as a measure of stability in the economy. Certainty breeds confidence in the business and investment environment which becomes favourable for investors and positively affects economic growth. Studies such as Ito and Krueger (1999), Korkmaz (2013) and Habib et al. (2016) have found the real effective exchange to be an important positive determinant of economic growth, hence this study expects the same.

3.4. Chapter summary

In this chapter the data and empirical methods that will be used to answer the research objectives were outlined. The empirical models and estimation techniques were explained and, as indicated, were informed by similar studies. The identity and measurement of the variables along with the sources of the data were also described. The results from this analysis and the implications of the results with regards to the research objectives of this study are presented in Chapter 4.

CHAPTER 4: RESULTS

4.1. Introduction

This chapter presents the results of the analysis described in the preceding chapter in order to determine the effect of total external debt on the economic performance of the FMEs. Firstly, the trends in GDP per capita and total external debt are examined over the period 1991 to 2016 on an individual country basis. Thereafter, the descriptive statistics across time and country for total debt, trade, gross capital formation, the real effective exchange rate, population growth rate and the growth rate in GDP per capita are reviewed. A correlation analysis also forms part of the initial data analysis and focuses on the strength of relationships between the variables in the regression model. The system GMM model results are presented and thereafter the findings of the study are discussed drawing on both the theory and previous empirical studies.

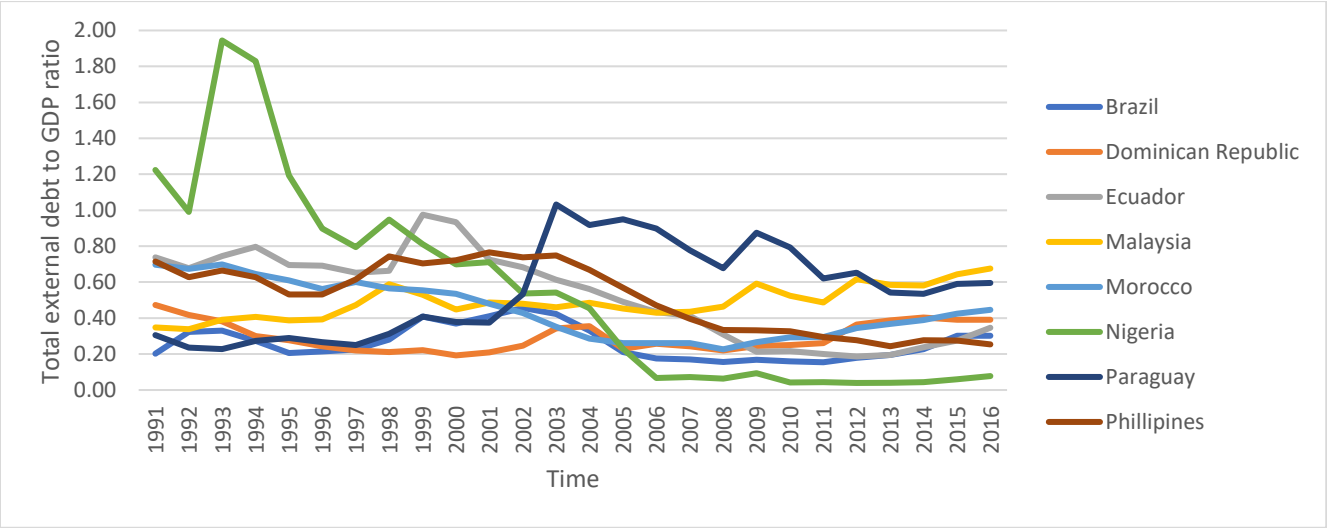
4.2. Preliminary data analysis

4.2.1. Trend analysis for total external debt and GDP per capita

Figure 4.1 demonstrates the total external debt to GDP ratio for each of the FMEs in the sample. As can be seen, several countries including Malaysia, Paraguay and the Dominican Republic, increased their external borrowing as a proportion of their GDP for the period under review.

Most notable, Nigeria's debt to GDP ratio increased sharply in 1991 till 1993. Udoka and Ogege (2012) document Nigeria's debt crisis emanating in the early 1990's, where the country was politically unstable. Capital flight had heightened and after reforms to reduce debt, it started to decrease significantly such that debts records a ratio lower than the level before 1991. In 2005 and 2006, the Nigerian government underwent debt cancellation of $40 billion after years of negotiations with the G8 nations. This resulted in a further decrease in the total debt levels (Hamakiwa, 2005). The rest of the countries maintained similar ratios across or some decreases are seen albeit insignificant.

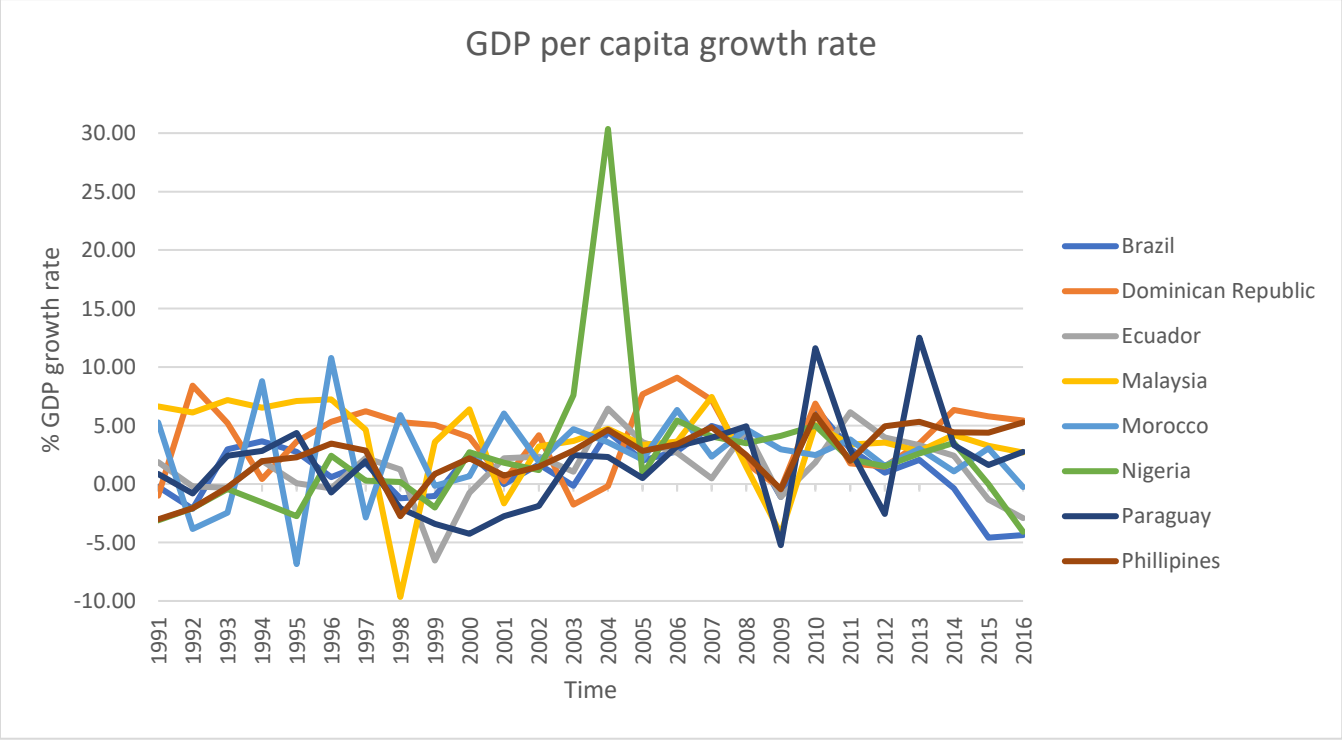
Figure 4.1: Total external debt to GDP ratio for the 8 FMEs



Source: Author's own elaboration

In *figure 4.2*, most of the countries maintained steady growth rates over the time period under study. Nigeria's GDP growth rate increased dramatically in 2004, just prior to the debt write-off.

Figure 4.2: GDP per capita growth rates for the 8 FMEs



Source: Author's own elaboration

4.2.2. Descriptive statistics

The descriptive statistics for the series are presented in Table 4.1 below. As can be seen the average economic growth rate of FMEs in this study is 2.3% with a maximum of 30.3% and a minimum of -9.7%. GDP per capita of the countries in the sample for the period 1991 to 2016 was $4 399, ranging from a low of $1 242 to $11 912. This shows that there was substantial diversity in the FMEs with regards to their level of income hence the growth rates of some countries can as differentiated.

The external debt to GDP ratio averages 46%, with a minimum of 4% and a maximum of 194%. The majority of the countries in this study thus do not appear to be over-indebted especially considering the average external debt to GDP ratio of EMEs was 44% based on the findings of Alper and Forni (2010). The gross capital formation average was 21%, with the lowest at 5% and the highest at 44%. The growth rate of the populations in the eight FMEs sampled averaged 1.8% over the period, with the highest at 2.69%; while the average ratio of trade to GDP was high at 78%, with a maximum of 220% and a low of only 15%. The real exchange rate exhibited substantial variability with a range from 49.74 to 272.34 and an average of 98.04. An average value of less than 100 suggests that the domestic currency is overvalued relative to the foreign currency.

Table 4.1: Descriptive Statistics

	Mean	Median	Std Dev.	Min	Max	N
LNGDPPC	2.35	2.47	3.88	-9.66	30.36	208
GDPPC	4399.93	3230.66	2881.17	1242.74	11912.15	208
EDEBT	0.46	0.40	0.28	0.039	1.94	208
EDEBT2	0.29	0.16	0.42	0.001	3.78	208
GFCAP	21.72	21.28	6.94	5.47	43.59	208
POP	1.80	1.69	0.50	0.82	2.69	208
REXR	98.04	97.78	22.90	49.74	272.34	208
TRADE	77.86	65.59	45.42	15.64	220.41	207

Source: Author's own elaboration

Notes: LNGDPPC= natural log of GDPPC/ GDPPC per capita growth rate = GDP per capita (in US); EDEBT = External debt; EDEBT2 = External debt squared; GFCAP; Pop = Annual population growth rate; REXR = Real exchange rate; Trade = Trade

Please refer to Appendix 1 for visual representations of GDP as a proxy for economic growth and total external debt as a proxy for external debt for each of the eight FMEs as examined in this

study. Economic growth mostly mirrors the path of external debt for the FMEs. For all figures, both external debt and GDP begin at low levels in 1991 and increase gradually towards 2016, the end of the study time period. This gradual increase also includes periods of decreases and further increases owing to different economic factors faced by the individual countries. Regardless of the movements, down or up, the two variables move in tandem.

4.2.3. Correlation analysis

As highlighted in the preceding chapter, three assumptions must be satisfied in order for a reliable correlation analysis to be undertaken. Based on the descriptive statistics, the means and median are not too far apart and it can be concluded that there are no outliers, and the variables are continuous by definition.

The correlation coefficients between GDP growth, total external debt and total external debt squared were negative. The values of the debt and debt squared coefficients showed weak correlations at -0.14 and -0.16. However, Rahman et. al (2012) and Okoye et al. (2017) found positive correlation between external debt and economic growth when they studied Nigeria and Bangladesh. Hence this is consistent with the expectations of this study.

Trade is highly negatively correlated with economic growth at -0.99. It should also be noted that trade is almost perfectly correlated with economic growth. This opposes the expectations of this study and studies done by Mehar (2013) and Jonsson (2016). Real exchange rate is weakly positively correlated with economic growth. This result is consistent with studies done by Ito and Krueger (1999), Korkmaz (2013) and Habib et al. (2016) and meets the expectation of this study. Gross fixed capital formation is weakly positively related with economic growth at 0.15. Panic (1967), Dritsakis et al. (2006) and Kanu and Ozorumba (2014) corroborate this finding and this result is therefore expected. Population is weakly negatively correlated with economic growth at -0.04. Da Vanzo (1980), Pattillo et al. (2002) also find similar results and this was expected for this study.

Table 4.2: Correlation matrix for independent variables

	LNGDP	**GDPPC**	**DEBT**	**DEBT2**	**TRADE**	**REXR**	**GFCAP**	**POP**
LNGDPPC	1							
GDPPC	0.01	1						
DEBT	-0.14	-0.28	1					
DEBT2	-0.16	-0.27	0.92	1				
TRADE	-0.99	-0.03	0.21	0.22	1			
REXR	0.06	-0.21	0.02	-0.02	-0.05	1		
GFCAP	0.15	0.15	-0.25	-0.29	-0.16	0.07	1	
POP	-0.04	-0.22	0.14	0.19	0.05	0.15	0.26	1

Source: Author's own elaboration

Notes: LNGDPPC= natural log of GDPPC/ GDPPC per capita growth rate, GDPPC =gross domestic product per capita (in US); EDEBT=External debt; EDEBT2=External debt squared; GFCAP; Population=Annual population growth rate; REXR=Real exchange rate; Trade= Trade

To sum up, the explanatory variables are not highly correlated with each other, save for trade which exhibited high correlation with economic growth. External debt and external debt squared are highly correlated with each other, which is expected as they are calculated using the same figure. None of the other variables have correlation coefficients greater than 0.3. It can therefore be concluded that multicollinearity is very low due to the low correlations between explanatory variables as per Cohen (1988) and Hemphill (2003).

4.3. Regression results

Table 4.3 below presents the results of the standard system GMM model based on equation 1.As can be seen, GDPPC was insignificant with a negative coefficient. This finding is consistent with Mbate and Elhiraika (2014) in their analysis of the relationship between public debt and economic growth in African countries; their coefficient on lagged GDP was insignificant in three of the four time periods over which the model was estimated. This may indicate that GDPPC is not significant in explaining GDP growth rate in growth models hence it is irrelevant to the model.

The debt variable has a coefficient of 5.06% and is significant at the 5% level as per its p-value of 0.023. The sign of the coefficient is positive, as expected, suggesting that for a 1% increase in total external debt, economic growth rises by 5.06%. With this, the null hypothesis is rejected, and it can be concluded that total external debt has a linear and positive relationship with the GDP growth rate. This means that total external debt improves economic growth for the eight FMEs studied. This result has crucial implications which are discussed further below. The squared debt variable is negative with a coefficient of -2.9%. The coefficient is weakly significant as the p-value of 0.06 lies below the 10% significance level but not the more stringent 5% measure. A negative and significant debt squared coefficient represents a maximum point in the function, implying the presence of an inverted U-shape, subject to further formal tests.

Table 4.3: System GMM estimates

Dependent variable: $\Delta lngdppc$				
	Coef.	*Std. Err.*	*z*	*P>z*
Constant	-4.570	20.924	-0.220	0.827
L. ($lngdppc$)	-0.285	0.313	-0.910	0.362
$debt$	5.062**	2.223	2.280	0.023
$debt^2$	-2.880*	1.555	-1.850	0.064
$gfcap$	0.126*	0.069	1.820	0.069
pop	-3.309***	0.881	-3.760	0.000
$rexr$	-0.003	0.025	-0.130	0.893
$trade$	-0.006	0.016	-0.360	0.720
Year	0.002	0.010	0.210	0.832
AR: (1)	-1.20			
Prob >χ^2	0.23			
AR: (2)	-0.50			
Prob > χ^2	0.614			
Sargan test χ^2	11.84			
Prob > χ^2	0.376			
Wald χ^2 (8)	123.32***			
Prob > χ^2	0.000			
Countries	8			
Observations	98			

Source: Author's own elaboration

*Notes: GDPPC=gross domestic product per capita (in US); EDEBT=External debt; EDEBT2=External debt squared; GFCAP; Population=Annual population growth rate; REXR=Real exchange rate; Trade= Trade; Δ denotes the difference operator. ***, ** and * denotes significance at 1%; 5% and 10% respectively*

The coefficient on capital formation is positive (0.13%) and significant, albeit only at the 10% significance level, while the population growth rate has a negative coefficient of -3.3% and is highly significant at the 1% level. The coefficients on the real effective exchange rate and trade are insignificant implying that these two variables did not contribute towards explaining the GDP growth rate of the FMEs in the study period.

The panel at the bottom of Table 4.3 reports the model specification tests. The test for serial correlation showed insignificant p-values for AR (1) and AR (2) of 0.23 and 0.61. With this, the null hypothesis was not rejected because the p-values are greater than the significance levels at both 5% and 10%. It is thus concluded that the error terms are not serially correlated. The Sargan test for over-identifying restrictions had a p-value of 0.38 which is also insignificant at the 5% and 10% levels. As such, the null hypothesis cannot be rejected, meaning that the instruments included in the model are free of endogeneity. Hence the model can be considered robust and produces reliable results.

As it was previously mentioned that more tests are to be conducted to confirm the non-linear hump-shaped function of debt and economic growth the U-test is conducted. The Lind-Mehlum (2010) test is conducted for the U-test and the results are documented in Table 4.4.

Table 4.4: U-test for non-linearity

Slope at $debt_{min}$ / d low	-0.6353
Interval / d 'low	(2.0947)
Slope at $debt_{max}$ / d high	0.9540
Interval / d 'high	(-0.4334)
Extreme Value	**0.8788**
U-test: *t-value*	0.4300
p>t	0.3330
95%, Fieller confidence interval	[0.7129; 2.5874]

Source: Author's own elaboration

The Fieller (1954) test is used to compute the confidence interval for the extreme value of the function. The extreme value is positive at 0.8788. The Fieller confidence interval at 95% of this extreme value is from 0.7129 to 2.5874. Hence, the extreme point lies within the interval. About 33% of the observations lies to the left of the extreme point whilst 67% of the observations lie to

the right of the extreme point. However, at significance levels of 0.05 (5%) or 0.1 (10%), the p-value of the extreme value is insignificant as it is greater than 5% and 10%. Therefore, the null hypothesis cannot be rejected indicating that total external debt and economic growth do not have an inverse U-shape pattern. With this, the curve seems to be U-shaped, confirming the null hypothesis according to the traditional Fieller test; the slope at d_{low} is negative while the slope at d_{high} is positive. Megarsa (2014) finds similar results of a U-shape. For this reason, it is concluded that external debt has a non-linear relationship with economic growth, in the form of a U shaped curve, instead of an inverted U shape. This may explain why the maximum point is insignificant - there is minimum point instead.

4.4. Discussion of results

The system GMM model, with strong explanatory power, presented a robust positive and significant coefficient for the total external debt, while total external debt squared was negative and weakly significant in the regression analysis. It is therefore concluded that total external debt has a positive relationship with economic growth and that the relationship is non-linear. A non-linear relationship was confirmed between economic growth and total external debt as shown by U-test results. There are two points which lie within the Fieller interval. At the start, the slope is negative at -0.6 and ends as positive at 0.9. This shows the non-linear relationship as U-shaped in nature, and not inverted as expected.

The results of this study are similar to Pattillo et al. (2004), Abbas and Christensen (2007) and Moore and Chrystol (2010), Shabir (2013). These studies found positive impacts of external debt on economic growth. With this, Frontier Market Debt has been issued by FMEs. Its issuance was oversubscribed. This may be further evidence and consistent with the existing literature explored that external debt has positive effects on economic growth.

To add on, the argument about original sin may be valid. When countries fail to borrow externally, in their own currency, and are made to borrow in foreign currency, currency mismatches occur as well as exchange rate fluctuations. However, FMEs have started borrowing externally in their local currencies, though on a lower scale (Sabbadini, 2017). With this, the debt costs become lower and risk of default reduces significantly. This implies that the use of debt is channelled to productive

economic activities at low risk of default and low risk of debt accumulation. The effects of original sin will be significantly reduced, allowing for an ease of repayment of external funds borrowed in already available local currency. Therefore, this may be a factor in explaining the significant positive relationship of external debt with economic growth in the FMEs under study.

The population growth rate is negatively related to GDP growth rate in both the correlation analysis and the regression analysis. This result is consistent with the Solow growth theory and Fincke and Greiner (2015), but inconsistent to the work done by Roy et al, (2016) and Kharusi and Ada (2018). High population growth rates aid in keeping the median age lower. With this, the younger population has high productivity potential as well as increase demand for goods. This fosters the productivity and eventually economic growth (Roy et al, 2016).

Capital formation is also significant in explaining the growth rate of GDP in the FMEs. This result is also consistent with the Solow Growth Model and meets the expectations of this study. Pattillo et al, (2014) and Okoye et al, (2017) also find a positive relationship. The level of infrastructure development in FMEs is therefore noticeable higher than in DCs, as a result of an increase in capital stock (Okonye et al., 2017). According to Knapp and Mansharamani (2015), FMEs have outpaced DCs with regards to capital stocks accumulation. Though capital markets of FMEs are still underdeveloped, most investors are deploying capital into these countries as a result of their positive future outlook. This may be the explanation of the positive significant coefficient between gross capital formation and GDP growth.

4.5. Summary

The results yielded for this study served to give light to two issues pertaining to external debt in FMEs. Using the system GMM model to investigate the two hypotheses, it was concluded that external debt and economic growth are positively related. This means that external debt can be used as a source of income for FMEs, as the use of external debt has significant positive effects on the economic growth. To add on, there is a non-linear relationship between external debt and economic growth; a U-shaped pattern was found, instead of an inverted U shape. As a result, no maximum value was found, and no threshold external debt to GDP ratio exists as a maximum point beyond which FMEs should stop borrowing.

CHAPTER 5: CONCLUSION

5.1. Introduction

Having run the regressions and analyses which pertain to the objectives of this study, results and findings were gathered. This chapter will conclude the study by giving summary of findings, policy recommendations as well as suggestions for future research.

5.2. Summary of findings

The evident long-term growth potential displayed by FMEs remains an additional path for international investors to tap into. The disconnection from mainstream global economics makes FMEs dynamic growth hubs, and also differentiates it from DCs, AEs and EMEs. Having established the niche in which FMEs exists, external debt was also proposed as an additional way of enhancing economic growth. Therefore in this study two objectives pertaining to external debt in FMES were investigated. Firstly, to determine whether external debt has a linear relationship with economic growth of FMEs, and secondly to determine whether or not a threshold level of external debt exists (to which FMEs ought to aspire to avoid over-indebtedness which has negative effects on their economies).

Eight FMEs were included in the sample namely: Brazil, the Dominican Republic, Ecuador, Malaysia, Morocco, Nigeria, Paraguay and the Philippines with data obtained from 1991 to 2016. Using the system GMM approach, regressions were run in order to test the two hypotheses. Several control variables that are known to explain economic growth were included in the economic growth equation in the form of the population growth rate, trade, gross capital formation, and the real effective exchange rate.

The results showed that external debt has a positive and significant linear effect on economic growth of the FMEs understudy. However, there is a non-linear relationship between external debt and economic growth rate. This non-linear relationship is U-shaped in nature, contrary to expectations of an inverted U-shape. Hence no maximum threshold level of borrowing exists. With a U–shape type of curve, debt initially causes a decrease in economic growth. As debt grows, it

begins to have positive impacts on economic growth rate forming a U-shape. This may be associated with prudent debt management strategies used in FMEs, that are effective in keeping external debt at levels which avoid over-indebtedness. This further implies that debt repayments are done satisfactorily enough for these FMEs to borrow more, given their good debt repayment culture. Contrary to this, Megarsa and Cassimon (2015) find an inverted U-shape in a similar study for DCs.

5.3. Policy recommendations

In light of the findings external debt can thus be seen as one of the principle sources of funds to continuously grow economies beyond growth rates which have been achieved by EMEs and DCs. This will have a significant impact on the international bond markets and may mark FMEs as the next generation EMEs with potential of above average returns. With this, the following suggestions are given to FMEs governments:

1. The composition of external debt remains crucial. FMEs should ensure that their debt profile has a larger proportion denominated in local currency than foreign currency. If it will be foreign currency, the Euro should be preferred as it is more stable than others. These two strategies curbs foreign currency risk, a risk which may cause drastic upward surges in debt service costs.
2. There should be credit metrics in place to be used for monitoring external debt. This assists central banks to actively trace and predict any variabilities in the debt portfolio.
3. Expanding the international bond markets through tapping into private institutions with good credit records may increase the reach for FMEs debt markets.
4. Due to the potential of FMEs utilising external debt prudently, it is important for FME governments to opt for fixed interest rates when issuing debt instead of variable interest rates. This reduces interest rate risk which further reduces debt service costs.

5.4. Suggestions for future studies

To this author's knowledge, this study provides the first investigation into the relationship between total external debt and economic growth exclusively in FMEs, where there are notable differences observed to the findings for DCs and EMEs. However, due to data limitations, the sample was restricted to only eight countries. Thus, in the future, more countries should be included in the sample so as to obtain more robust findings.

To add on, further studies may conduct a similar study but focus on two data sets, DCs and FMEs. Mergesa and Cassimon (2015) study DCs and find an inverted U-shape pattern. This may suggest that the level of economic development of a country influences debt management strategies and debt cultures. Here, FMEs have a U-shape curve while in DCs an inverted U-shape is evident.

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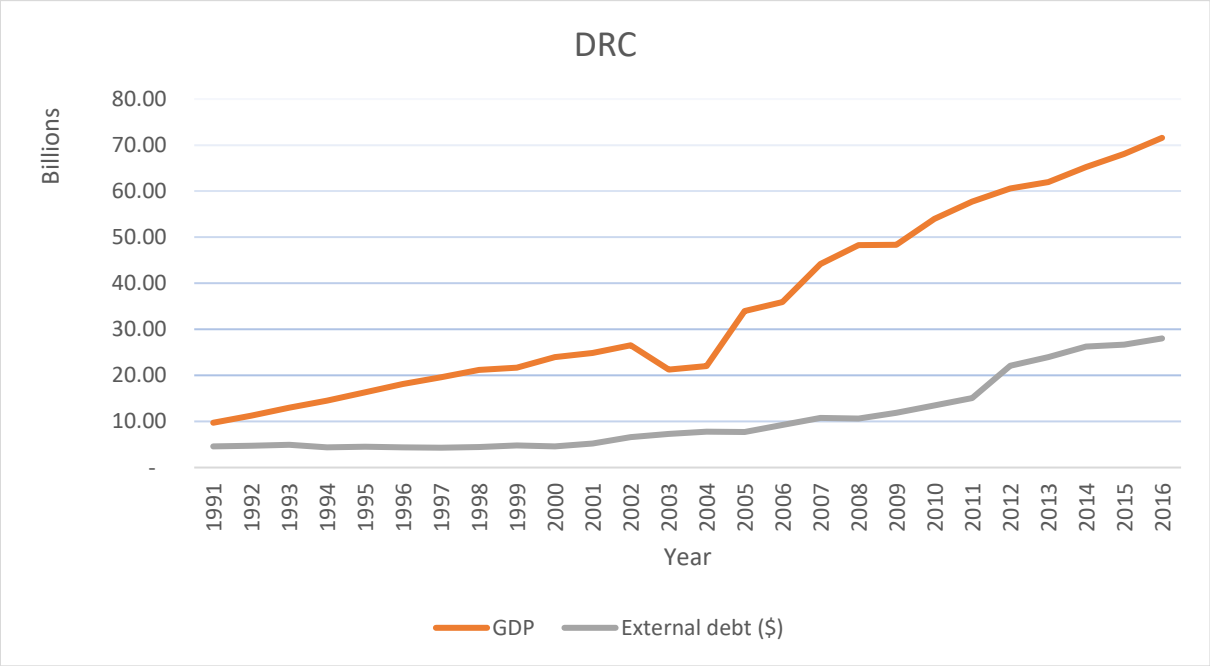
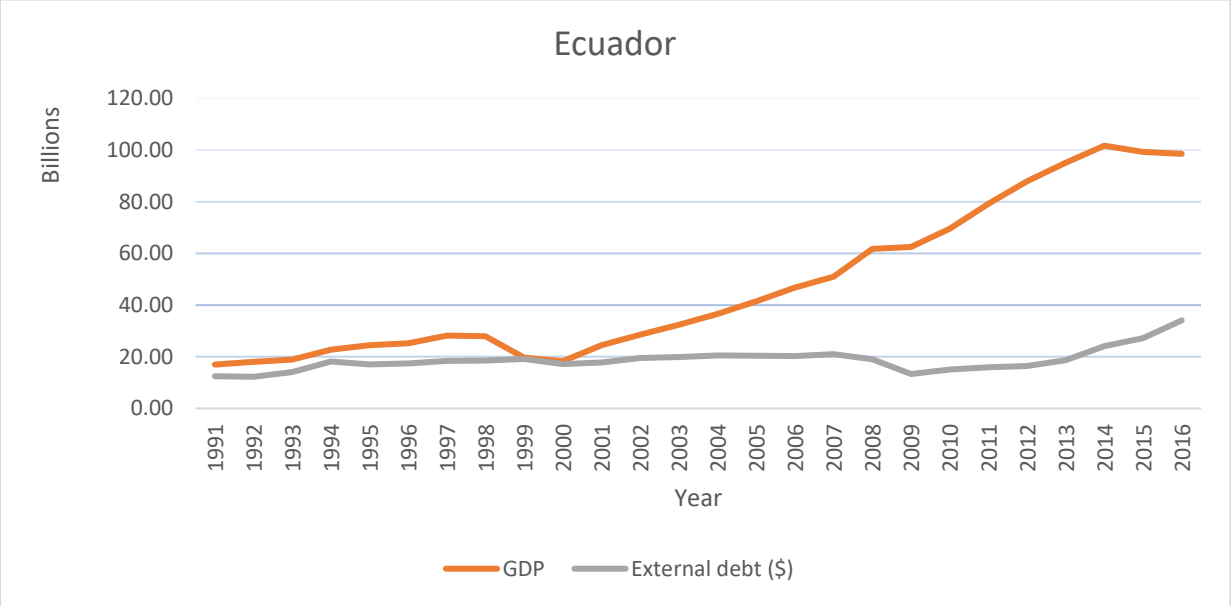
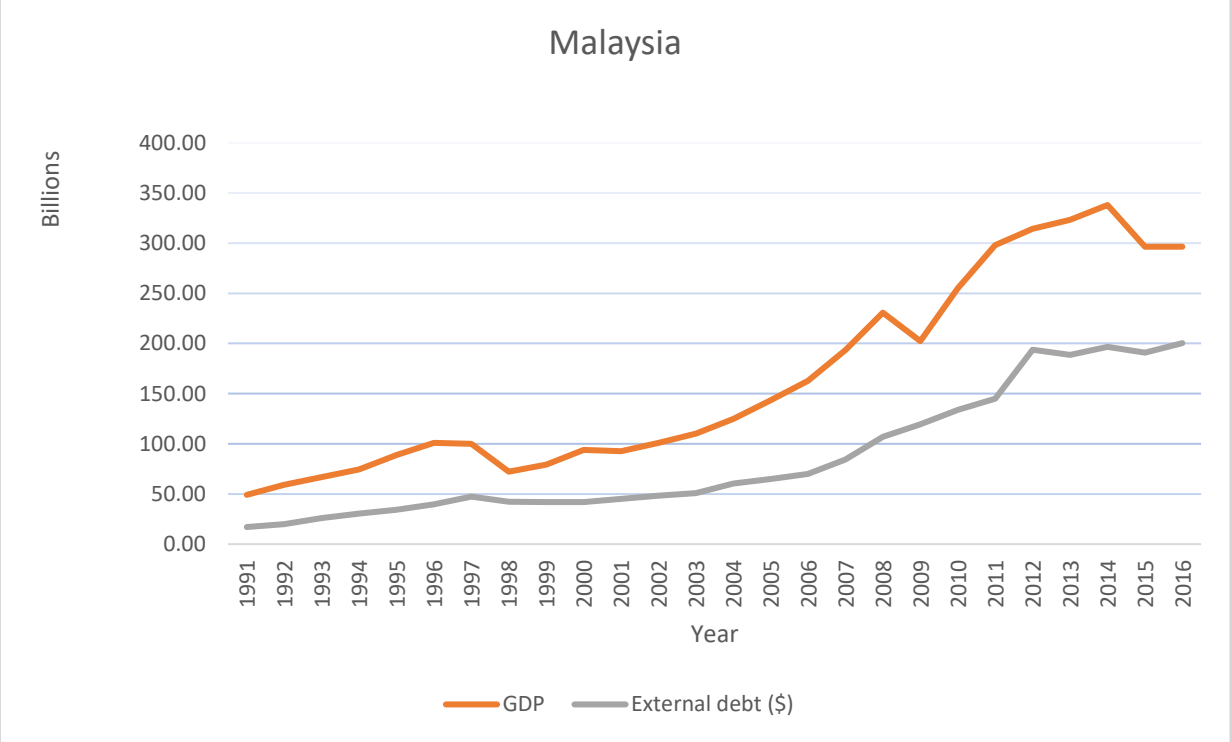
APPENDIX

Panel A: GDP and External debt trends for Brazil and DRC

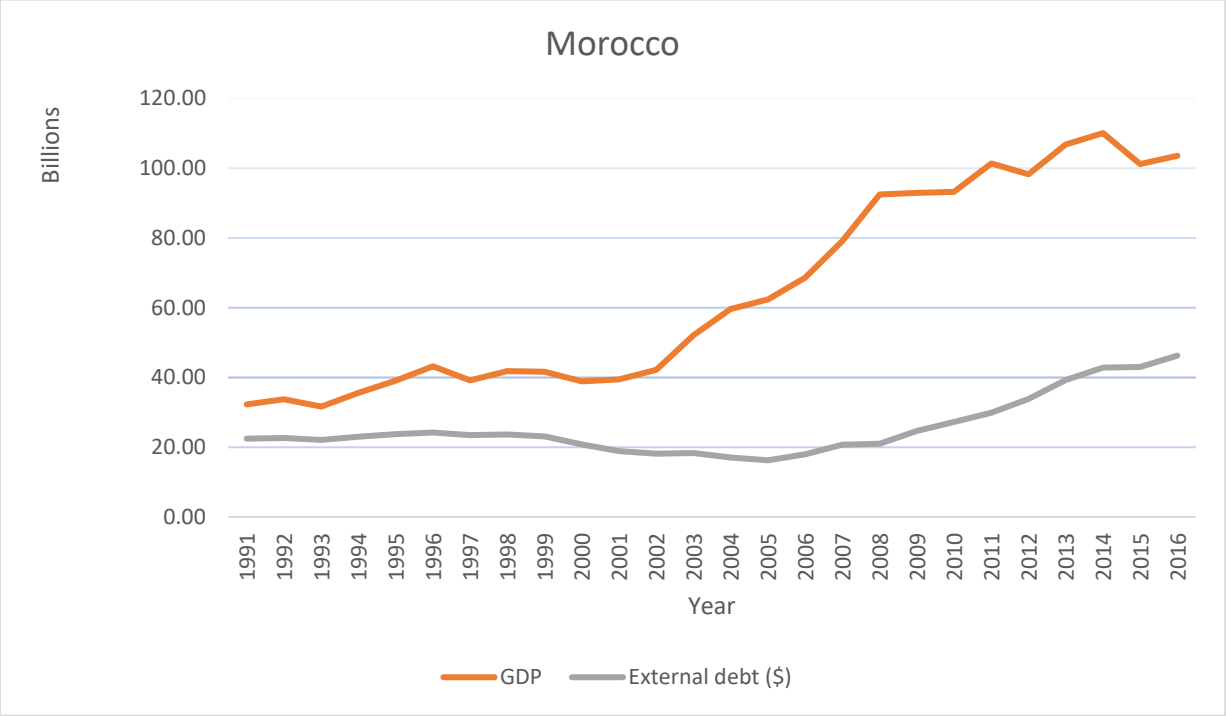


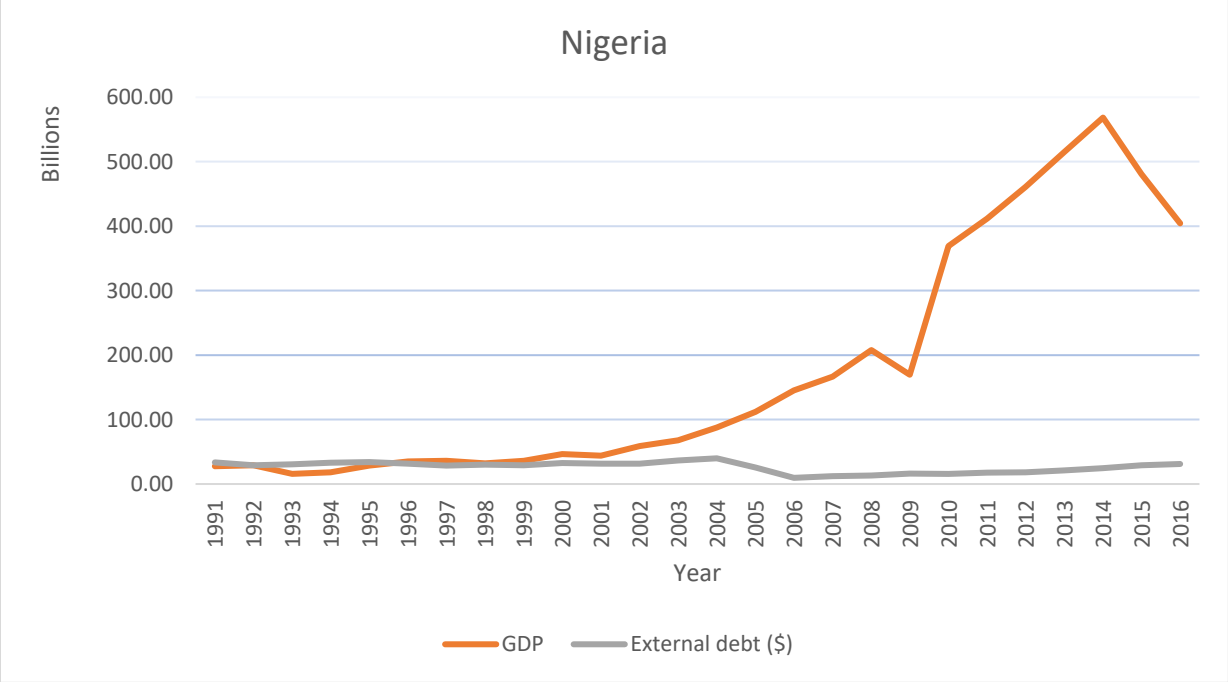
Panel B: GDP and External debt trends for Ecuador and Malaysia





Panel C: GDP and External debt trends for Morocco and Nigeria





Panel D: GDP and External debt trends for Paraguay and Phillipines